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NATIONAL DAM SAFETY PROGRAM. CURVED DAM-LOCK 7 (INVENTORY NUMBE--ETC(U)
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OSWEGO RIVER BASIN

CURVED DAM-LOCK 7

OSWEGO COUNTY
NEW YORK

INVENTORY № NY 398

(11) 28 Sep 79

(10) John B. /Stetson [redacted]

(12) 185

PHASE I INSPECTION REPORT

(6) NATIONAL DAM SAFETY PROGRAM.

Curved Dam-Lock 7 (Inventory Number NY 398), Oswego River Basin, Oswego County, New York. Phase I Inspection Report,

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NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979 — 393 970

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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TABLE OF CONTENTS

	Page
Preface	
Assessment of General Conditions	i-ii
Overall View of Dam	iii-ix
Section 1 - Project Information	1-4
Section 2 - Engineering Data	5
Section 3 - Visual Inspection	6-7
Section 4 - Operational Procedures	8
Section 5 - Hydrologic/Hydraulic	9-12
Section 6 - Structural Stability	13-16
Section 7 - Assessment/Remedial Measures	17-18

FIGURES

Figure 1 - Location Map
Figure 2 - Plan for a Stone Apron to Oswego Dam
Figure 3 - Construction History (Curved Dam)
Figure 4 - Improvements of the Oswego Canal, Section 2
Figure 5 - Contract 37, Plan and Profile Sta. 1148 to Sta. 1164
Figure 6 - Contract 35, Location Plan Above Lock 7
Figure 7 - Contract 35, Plan, Elevation, and Sections for Modifications of Curved Dam
Figure 8 - Contract 101, New Gates and Lowering Upper Sill
Figure 9 - Contract M 70-9 For Rehabilitation of Lock 0-7
Figure 10 - Contract M 70-9 For Rehabilitation of Lock 0-7
Figure 11 - Contract M 70-9 For Rehabilitation of Lock 0-7
Figure 12 - Contract M 70-9 For Rehabilitation of Lock 0-7
Figure 13 - Control Structure at Lock 0-7
Figure 14 - Computed PMF and 1/2 PMF Discharges on Gaged Record of Discharge-Frequency Curve

APPENDIX

Field Inspection Report	A
Previous Inspection Reports/Relevant Correspondence	B
Hydrologic and Hydraulic Computations	C
Stability Analysis	D
References	E

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Curved Dam at Lock 7, NY398

State Located: New York
County Located: Oswego
Stream: Oswego River
Date of Inspection: May 31, June 7, 1979

ASSESSMENT OF GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

1. Within one year of notification, complete the following investigations:

   a. Perform a detailed investigation including subsurface investigations to determine the extent of and method of repair for through-the-dam and under-the-dam seepage.

2. After the aforementioned investigations, the remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

   a. Repair seepage and leaks through and beneath the dam.

   b. Repair the masonry in the east abutment wall. Align the masonry units and replace the missing masonry unit.

   c. Repair the boil located in a land area along the riverside wall of the navigation channel.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 62,500 cfs at 76% of the PMF, with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. Since the dam is capable of passing the 1/2 PMF without being overtopped, it is assessed as inadequate.

Dale Engineering Company

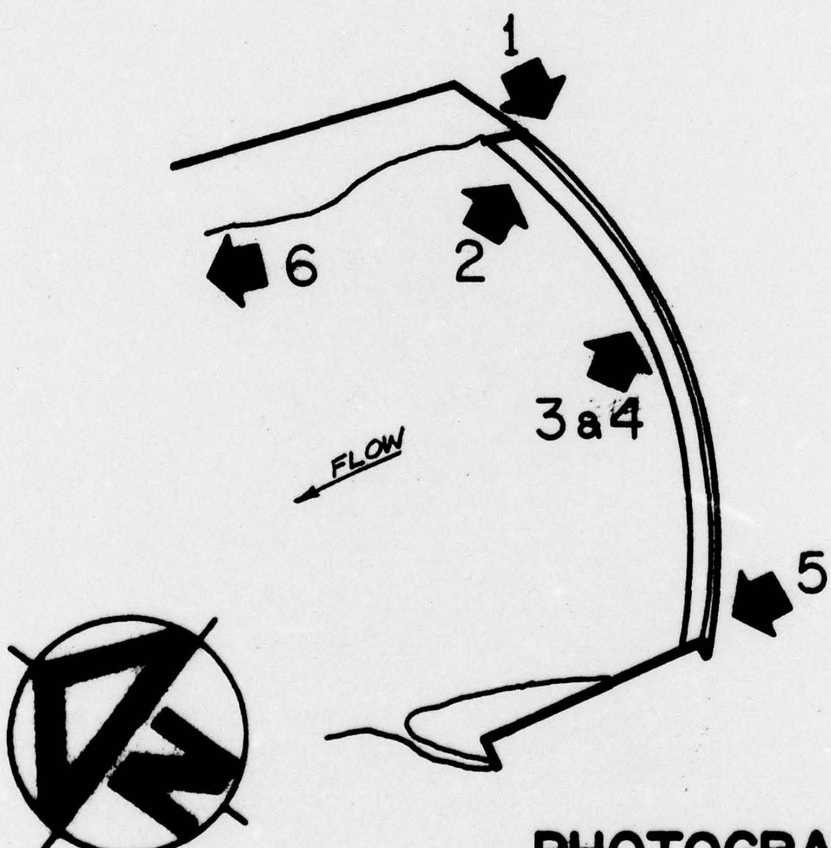
John B. Stetson, President

Approved By:
Date: 28 Sept 79

Col. Clark H. Benn
New York District Engineer

Overview of stone masonry dam located adjacent to Lock O-7 at mile 1.4 of the Oswego River at Oswego, New York (Lower Dam). Reservoir pool is drawn down below spillway crest and flashboards are in process of being replaced.

CURVED DAM



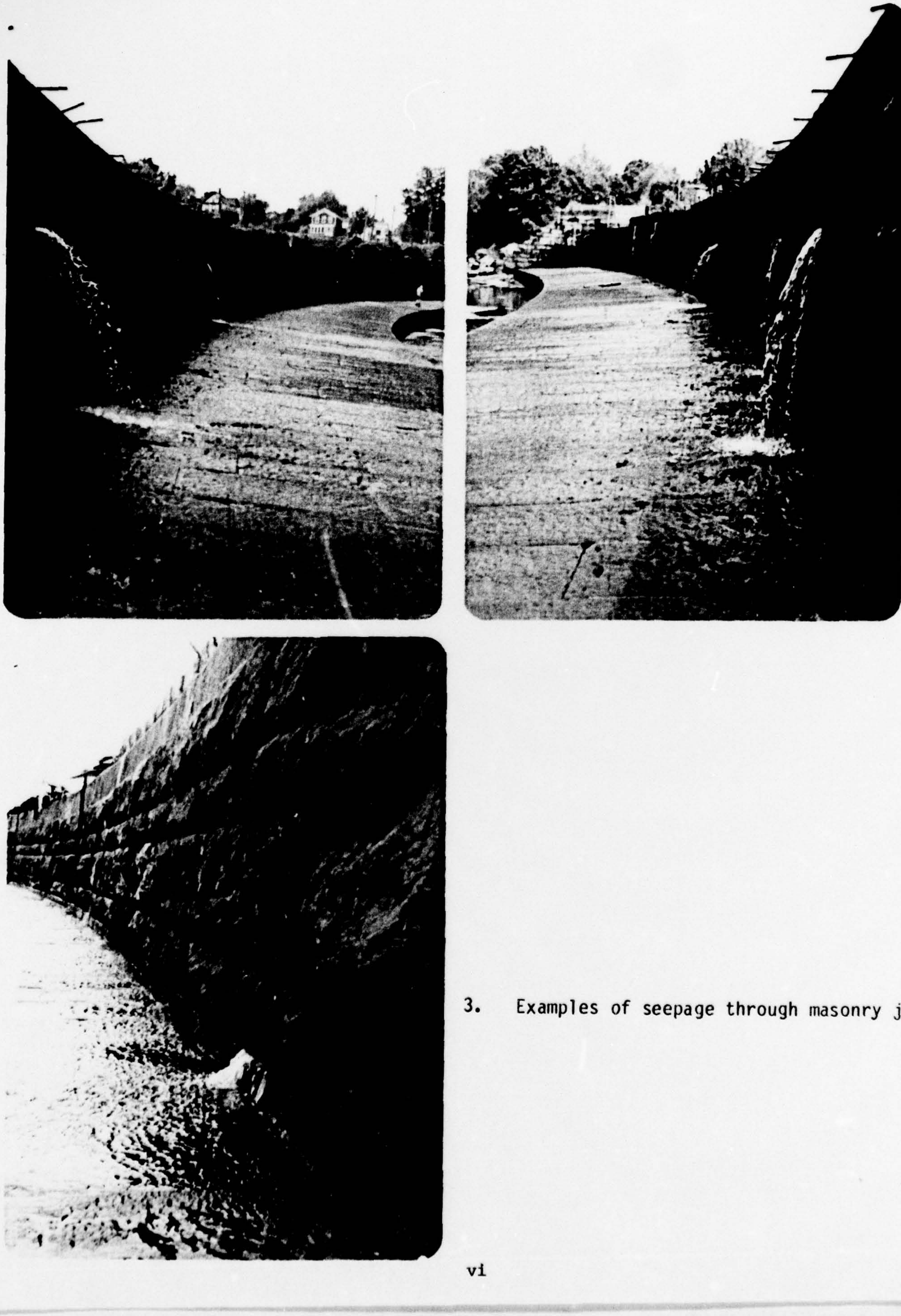
PHOTOGRAPH KEY MAP

STETSON • DALE

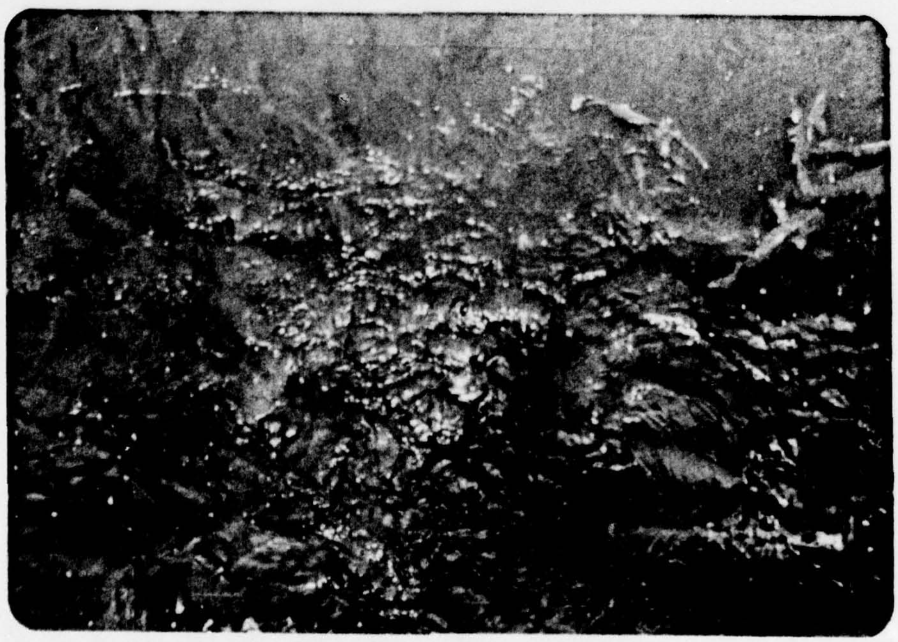
DATE	DRAWN	
7·17·79	JPG	
JOB	APP'D	
2305		

1. View across top of spillway showing large cap stones.

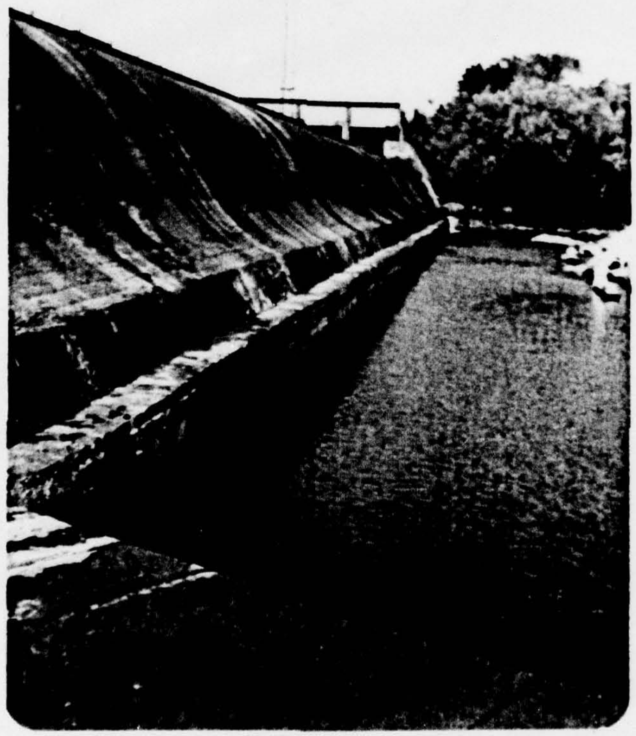
2. Masonry head wall on east side of spillway shows some movement of masonry units. Opening below spillway apron caused movement of masonry element above it.



3. Examples of seepage through masonry joints.



4. Through or under the dam flows were located below the apron in the center of the dam as shown in the close-ups. These flows can be seen just beyond the people. The second location is approximately 25 feet beyond the first.



5. The side channel spillway on the west side of the river appears to be in relatively good condition.

6. Downstream hazard area in the City of Oswego.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - CURVED DAM - LOCK NO. 7 ID# - NY 398

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Curved Dam - Lock Number 7 and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Curved Dam at Lock Number 7 consists of a 517 foot long curved masonry gravity structure. The curved section terminates on the west bank of the river in a 250 foot long concrete side channel spillway. The spillway in turn terminates at the face of a power generating station which is situated on the west bank of the river. The east abutment of the dam terminates at an approach channel wall to Lock No. 7 of the Oswego Canal. The dam is 14 feet high and is founded on bedrock throughout its length. The combination of lock, dam and power generating station spans the entire width of the Oswego River. The dam is the last of a series of six dams which regulate the flow in the Oswego River for use in navigation and power generation.

b. Location

The Curved Dam at Lock Number 7 is located in the City of Oswego, Oswego County, New York.

c. Size Classification

The maximum height of the dam is approximately 14 feet, the storage volume in the impoundment is approximately 650 acre feet. Therefore, the dam is in the Small Size Classification as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the City of Oswego, and it is also used for navigational purposes. The dam is therefore in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

Region Three:

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

f. Purpose of the Dam

The dam is used to regulate flows in the Oswego River for navigation use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The main dam was originally completed in 1857. In 1894 the timber apron in front of the dam was replaced with a stone-block masonry apron. In 1896 the dam was raised so that the depth of the Oswego Canal could be increased from 7 to 9 feet. In 1908 when the Barge Canal was built, the dam was again raised about 2-1/4 feet by the addition of coping stones. This work was completed in 1912. The side spillway weir was constructed sometime subsequent to 1925. No plans were found on the construction of this weir.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation in cooperation with the Niagara Mohawk Power Corporation. The main function of the facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is for power generation at the Niagara Mohawk Power Generating Facilities. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest. In order to maintain this level and have adequate flows for power generation, the Niagara Mohawk Power Corporation places flashboards on the dam each spring to provide sufficient impounded water during the low run-off periods. The gates which control the flow into the forebay of the power generating station are owned and operated by the New York State Department of Transportation. These gates may be closed to shut off the flow to the generating facility. Representatives of the New York State Department of Transportation indicate that it has been unnecessary to manipulate these gates in order to regulate the generating flow. The gates are used only to dewater the forebay channel for maintenance purposes.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the Curved Dam - Lock 7 is 5121+ square miles.

b. Discharge at Dam Site

Peak discharges recorded at USGS gage 0424900 at site.

28 Mar 1936	37,900 cfs
10 Apr 1940	35,000 cfs
27 Jun 1972	32,300 cfs.

For other values of annual peaks, see Appendix C.

Computed discharges:

Ungated spillway, top of dam (total)	62,500	cfs w/o flashboards
	30,000	cfs w/flashboards**
Main spillway section only	38,000	cfs w/o flashboards
Ungated spillway, design flood	30,000	cfs
PMF	81,900	cfs
1/2 PMF	46,800	cfs
Maximum Navigation Pool	17,000	cfs
Gated drawdown, peak through powerhouse	7,400	cfs

**Flashboards are designed to fail at 1.5 feet of head. However, if flashboard failure does not occur, discharge capacity will be as indicated.

c. Elevation* Barge Canal Datum (U.S.G.S. + 0.99)

Top of dam	275.6
Ungated Spillway	
PMF	277.0
1/2 PMF	273.5 w/o flashboards
Maximum Navigation Pool	273.0 w/o flashboards
Spillway crest with flashboards	271.0
w/o flashboards	268.5
Stream bed at centerline of dam	254.5

d. Reservoir (Up to Dam at Lock 6)

Length of maximum pool	2000 ft.
Length of normal pool	2000 ft.

e. Reservoir Area

Top of dam	46.8 acre
Maximum pool	46.8 acre (1/2 PMF)
Spillway pool	46.8 acre

f. Dam

Type - Stone masonry primary spillway, crested concrete side spillway
Length - 517 feet across river
Height - 14 feet
Freeboard between normal pool and top of dam - 5 feet.
Top width - 7 feet, 8 inches.
Side slopes - Downstream 1 inch/foot
Upstream 3 inches/foot

g. Spillway

Type - Overflow weir main spillway, crested weir side channel spillway.
Length - 482.5 main spillway, 250.0 feet side channel spillway.
Crest elevation - 268.5 w/o flashboards.
Gates - Gates only control flow to hydropower facility.

h. Regulating Outlets

Maximum discharge through powerhouse 7400 cfs.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation consisting of contract drawings of this dam, has been included in this report. This information is contained in Figures 1 through 12. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 12 along with previous inspection reports on the dam by New York State Department of Transportation and New York State Department of Environmental Conservation. A record of modifications and major maintenance activities by the Department of Transportation are also included through 1967. The last recorded New York State Department of Environmental Conservation inspection was dated 1915. An additional site channel spillway section, not included in the original construction plans, was added to the dam on the west side of the river in 1925.

2.3 OPERATION

No operation manual is known to exist for this structure.

2.4 EVALUATION

The plans reviewed as a part of this investigation agree with observations made in the field. The spillway capacity of the west bank section was estimated without the benefit of having plans. The information included in this report included in this report is adequate to complete this Phase I investigation. Therefore, no additional requirement for data is given.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Curved Dam at Lock Number 7 was inspected on May 31, 1979 and again on June 7, 1979. The Dale Engineering Company inspection team was accompanied on the inspection by Richard Aldrich of the New York State Department of Transportation, Region 3, and on the second inspection by Robert McCarty of the New York State Department of Environmental Conservation, Dam Safety Section.

b. Dam

Modifications to the dam structure and appurtenant facilities have taken place throughout the years since its original construction. During the second inspection of the dam the water level was drawn down below the flashboards to allow a detailed inspection of the front face of the dam. During this inspection four leaks were found in the masonry on the downstream face of the dam. These leaks are shown in Photograph No. 3. In each case seepage is occurring through the deteriorated masonry joints. This inspection also disclosed two points where flow is occurring through or under the dam. These flows are located near the toe of the concrete apron near center of the dam (See Photograph No. 4). Masonry units on the east abutment also show some settlement. Both the surface of the spillway and the concrete apron were found to be generally in good condition.

c. Spillway

The side channel spillway at the west end of the curved dam also appeared to be in generally good condition. The spillway was operating at a head of approximately 3 inches at the time of the first inspection. Stop planks were in place in the outlet structure to an elevation of 2 feet, 6 inches above the spillway level.

d. Appurtenant Structures

The east end of the dam terminates at an upstream approach channel to Lock Number 7. The concrete wall at the upstream approach channel to Lock Number 7 has been resurfaced on the face toward the canal. This restoration was done in approximately 1970. Concrete surfaces above the waterline are in generally good condition, although some deterioration was noted below the water level. A small boil was found to exist at a point on the west face of the approach channel wall approximately 4 feet from the toe of the wall. Silt material was bubbling up and deposited in a boil type configuration. This flow was located approximately halfway down the upstream approach channel to Lock Number 7. The area in question was operating with a hydraulic

head of approximately 5-1/2 feet. Some dampness was also noted on the exterior face of the wall in this area.

The flow into the Niagara Mohawk Power Generating Station, located on the west bank of the Oswego River, at the end of the side channel spillway, is controlled by a series of gates which are owned and operated by the New York State Department of Transportation. These gates are mechanically operated wooden stop gates which control the flow into the forebay of the generating station. The gates are hoisted by a chain hoist which travels on rails across the top of each individual gate. The gates are hoisted up and locked into place by pins in the rail assembly. These gates, although operable, have not been used in a long time.

e. Control Outlet

Outlet from the impounded area is controlled by regulating the flow through the power generating station. Drawdown of the impoundment for the second inspection was accomplished by increasing flow through the power generating station. The power generating station is in use at present by Niagara Mohawk Power Corporation.

f. Reservoir Area

The reservoir area extends approximately 2,000 feet upstream to Dam No. 6 which performs a function similar to this facility. There are no areas of bank instability along this reach of river.

g. Downstream Channel

The downstream channel is formed in bedrock and is in generally good condition. No evidence of erosion was noted.

3.2 EVALUATION

Visual inspection reveals spurting leaks through the masonry of the curved dam and through or under the dam seepage under the apron of the curved dam. A boil was observed along the base of the upstream approach channel to Lock Number 7. The dam is founded on bedrock and shows no other evidence of structural problems or instability. No major deformation of the alignment of the structure was noted in the visual inspection.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water level in the impoundment upstream from the dam for navigational purposes in the Oswego River. A secondary operational procedure is the utilization of excess water for power generating purposes. Total operational procedure is under the control of the New York State Department of Transportation. The operation is done in cooperation with Niagara Mohawk Power Corporation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. The flashboards are put in place by Niagara Mohawk Power Corporation. Once every two years a visual inspection is made of the structure by a New York State Department of Transportation inspector, and a report on the condition of the structure is filed at the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled on a priority basis partly as a result of the bi-annual inspection.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the entrance to the forebay of the power generating station are under the control of the New York State Department of Transportation. These gates are operated infrequently and are used to accommodate Niagara Mohawk when dewatering of the forebay is required.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the Department of Transportation. Maintenance on the control gates to the forebay of Niagara Mohawk Power Station has been infrequent. Recent maintenance and repairs has been performed on the locks and approach channel wall. The fact that the through-the-dam seepage has been known to exist prior to this inspection and that no investigative action prior to this inspection was taken, indicates that past maintenance procedures on this dam may have been adequate. This inspection team cannot concur with the Department's conclusions presented in Appendix B on the basis of a visual inspection.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin, located in central New York State, has a drainage area of approximately 5,123 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The complex river system includes the seven Finger Lakes, Oneida Lake, Onondaga Lake, the Barge Canal and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego and Oneida, are incorporated into the Barge Canal System as are Oneida, Cayuga and Seneca Lake. All of the lakes have regulated outlets except Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not also considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures are beyond the scope of this analysis due to the fact that the dam is a run of river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Small Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the Department with assistance from the U.S. Army Corps of Engineers, Buf-

falo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings. It then obtained the flood records at the USGS gage at Lock 7 near the dam sites, and within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designation, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. The model was recorded for the HEC-1DB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for by increasing the Modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed; it distributed the rainfall over the 5,100 square mile area. If further in-depth investigations are made, they should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater run-off. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 7 is one of six dam investigations on the Oswego River. These dams are located at Locks 1,2,3,5,6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego). It assumes the discharges from the 6-hour time increment PMF hydrographs will effectively be the same for all the dam sites since the upstream run-off area is over 5,000 square miles and the downstream run-off area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 14).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway which reaches across the effective width of the river, a distance of 500.0 feet. Since the dam is a slightly curved gravity dam and has a 250 foot side channel spillway, the effective crest length is 767 feet. The side channel spillway design head was estimated from the geometry of the section, and computed to be at 8.00 feet (no plans are available, taken from photographs). Subsequently, discharge coefficients were computed in the range of 3.30 to 4.23. The overflow spillway discharge coefficient was 3.3.

Submergence was checked and found not to be effective up through the PMF. At the top of dam elevation, the overflow spillway capacity was computed at 38,000 cfs, with the side channel the total capacity is 62,500 cfs. Certain plans for these six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. The side channel spillway was apparently added sometime after. The gage at Lock 7 has recorded no events greater in magnitude than the total spillway top of dam capacity. The PMF magnitude was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

	Without Flashboards	
	Discharge	Capacity as % of PMF
PMF	81,900 cfs	76%
1/2 PMF	46,800 cfs	133%

The inspection team found no plans for the side channel spillway. In performing and reviewing the above analysis a slight discrepancy may have been discovered in assuming the side channel spillway crest is the same as the main dam spillway. It may likely be a foot higher as can be observed in the photographs provided in this report. No effort has been made in this report to resolve this problem. The result is that the dam is still capable of passing the 1/2 PMF even with a 1 foot error in the assumed elevation. If during a major flood the flashboards stand up, dam overtopping would result at a flow lower than 35,000 cfs. Niagara Mohawk Power Corporation indicates the flashboards were designed to fail with 1.5 feet of head. The flashboard system consists of solid steel pins with steel poles, 1-3/4 inches o.d., spaced 5.5 feet o.c. with wood flashboards. The dam is stable at the 1/2 PMF flow.

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam is estimated at approximately 650 acre feet in the river channel. Lock 6 is approximately 1/2 mile upstream where the Upper Oswego Dam (High Dam) is located.

5.5 FLOOD OF RECORD

Floods are measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft.; the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that 4 events have had flood discharges in excess of the dam's original design flood. None were greater than the existing top of dam discharge capacity.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs
April 4, 1960	31,200 cfs

A Corps of Engineers' investigation entitled Post Hurricane Agnes, June 20-26, 1972 Investigations indicated only $14,000 in damages occurred in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped as follows:

	OVERTOPPING IN FEET
PMF	1.4
1/2 PMF	None

According to this analysis, the dam has not been overtopped to date since the top of dam discharge capacity is around 62,500 cfs. The dam would not be overtopped with a 1/2 PMF flood.

5.7 EVALUATION

The spillway is inadequate to pass the Probable Maximum Flood (PMF) without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate since the spillway will pass the 1/2 PMF without overtopping the dam.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations And Data Review

The dam facility was observed under drawn down conditions, so that the downstream faces of the main curved dam spillway and side dam spillway were visible. The upstream faces of these structures were below water. The sections visually retain stability, with the construction materials generally in good condition. Leakage does occur through joints in the stone of the main curved dam at several locations, but, the condition does not appear to be having an adverse effect on the structure's stability. Seepage was noted at two locations slightly downstream of the block stone spillway apron, but the condition has not had a noticeable structural effect on the dam sections. The poured concrete comprising the visible section of the side dam/spillway is in sound condition.

Some lateral displacement in the stone block headwall for the curved dam's east abutment has apparently occurred. The condition appears to have had no effect on the adjacent dam section.

The navigation channel to Lock O-7 is located east of curved dam, with the lock being some distance downstream of the dam. A land area separates the channel and the dam's downstream area of river. A poured concrete structure serves as the wall between the ship channel and adjacent land. The surface of the concrete in this channel wall has deteriorated at numerous locations, and limited through-the-wall seepage occurs.

b. Geology and Seismic Stability

Curved dam is in the Oswego River drainage basin, located within the Ontario Lowland which is part of the Central Lowland Province. The dam is sited on bedrock which is a fine-grained, well-cemented sandstone, the Oswego Sandstone of Upper Ordovician age. Dip of the unit is less than 1° to the south.

According to the inspection report by Stellato, May 24, 1979, (included in Appendix B), the apron's stone masonry blocks are bolted to bedrock and pinned together. It is also indicated that in 1894, the joints in the sandstone bedrock were to be filled with concrete and masonry. It is felt that through-the-dam seepage seen near the apron toe are the result of seepage through bedrock joints where mortar has deteriorated or was not applied. The bedrock is considered as having good bearing capacity and durability, and does not weather nor deteriorate readily. However, poor grouting and under- dam seepage could account for removal of layers of bedrock at the dam's apron.

The stone blocks comprising the downstream face of the dam are limestone. The blocks were observed to be in good condition. Leaks between the blocks are not attributed to block deterioration.

There are no known faults or shear zones in the vicinity of the dam according to the New York State Geologic Map (1970). The Preliminary Brittle Structures Map of the New York State Geologic Survey (1977) indicates a possible fault zone, based on drill hole data, located about 4 miles southeast of the dam.

This area is located near the border of a Zone 2 - Zone 3 designation on the Seismic Probability Map but is most probably in Zone 2. No earthquake activity has been recorded in the vicinity of the dam. The closest earthquake, intensity III (modified Mercalli Scale), occurred in 1925 about 30 miles west of the dam. In 1954, an earthquake of intensity IV occurred about 31 miles to the south. Several other minor earthquakes have occurred in the region, none closer than the two mentioned nor more recent than 1954.

c. Data Review and Stability Evaluation

Design drawings and past reports made available for this study (Figures 2 - 12) provide information on the dam's cross section, construction materials and foundation material. However, properties of the dam materials and foundation rock are not indicated. Stability analysis for curved dam are not included, but such computations for the subsequently constructed side of the spillway are shown. As part of the present study, stability evaluations for the curved dam have been performed. Where data necessary for analysis was lacking, practical assumptions have been made; properties of the site's dam and foundation materials have not been determined in this investigation. The stability computations utilize a cross-section based on dimensions indicated by the plans included in this report, and assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loadings. It should be considered that in areas where deterioration has occurred, section dimensions would be less than indicated by the plans with some adverse effect on the structural strength expected.

The results of stability computations for different loading conditions are summarized in the table below. The stability analysis are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant*** Passing through Base
(I)	Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting	3.0±(1) 1.25±(2)	---- 7.5±(2)	---- 0.33(b)(2)
(II)	Water elevations at 1/2 PMF level, uplift acting on base as computed for normal operating conditions.	4.7(1) 1.37(2)	--- 7.4±(2)	---- 0.33b(2)
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	4.1±(1) 1.21±(2)	---- 6.2±(2)	---- 0.33b(2)

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

(1)Based on full passive resistance developed by a downstream apron monolith, see Appendix D.

(2)Based on 20 percent or less partial passive resistance developed by downstream apron, see Appendix D.

The analysis indicates the dam is stable under forces expected under normal operating conditions (including ice), and the 1/2 PMF and PMF condition.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on full headwater hydrostatic pressure acting on the dam's upstream corner and a full tailwater hydrostatic pressure acting at the dam's downstream corner. Uplift pressure was assumed to vary linearly between the dam's upstream and downstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant in arriving at the computed factors of safety against overturning.

Uplift as computed for the normal operating condition was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period, because of expected low foundation rock permeability.

Consideration of the field observations and stability analysis indicate the need for some corrective measures to improve the stability of the curved dam. Paths of under-dam seepage should be sealed, for it is expected that the uplift pressures acting at locations of such flow during flood conditions would be greater than the uplift assumed in analysis, and is a condition which could effect stability and cause progressive deterioration of the structure. Similarly, open joints in dam masonry should be mortared to assure the structural integrity of the dam section is retained. Masonry repair/maintenance should extend to the abutment headwall at the dam's east end. Similarly, corrective measures to correct the leakage condition occurring in the shipping lock's channel wall should be undertaken.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of the Curved Dam at Lock 7 did not indicate conditions which constitute an immediate hazard to human life or property. However, the through-the-dam seepage condition could develop into a hazardous condition at some time in the future. The dam would not be overtopped by the 1/2 PMF and can safely discharge 76 percent to the PMF. Therefore, the spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria.

The following specific safety assessments are based on the Phase I visual examination analysis of hydrology and hydraulics, and analysis of structural stability:

1. Four leaks were found in the downstream spillway face of the dam. Seepage is occurring through deteriorated masonry joints.

2. At two locations, through or under the dam flows were observed at the toe of the apron in the center of the dam.

3. Masonry units on the east abutment show some settlement. An abutment masonry unit is missing at the location of the apron.

4. A boil was discovered in a land area adjacent to the navigation channel on the riverside of the concrete wall midway between the dam and the lock.

5. The dam visually conforms to the plans except that a side channel spillway, 250 feet in length, has been added to the west side of the dam, parallel to river channel flow.

6. The mechanical equipment of the locks is in operating condition.

b. Adequacy of Information

The information available is adequate for this Phase I investigation, although plans were not available for the side channel spillway. Information was in general, limited to construction plans.

c. Urgency

The through-the-dam seepage condition needs to be further evaluated. This investigation should be undertaken immediately and completed within one year from notification. Upon completion of the investigative phase, required design and construction should commence and the remedial work should be completed within two years of notification.

d. Need for Additional Investigation

To prevent the development of potentially hazardous conditions, seepage condition investigations should be performed to determine remedial measures to repair the seepage and evaluate the existing stability of the spillway. This work should include subsurface investigations involving borings.

7.2 REMEDIAL MEASURES

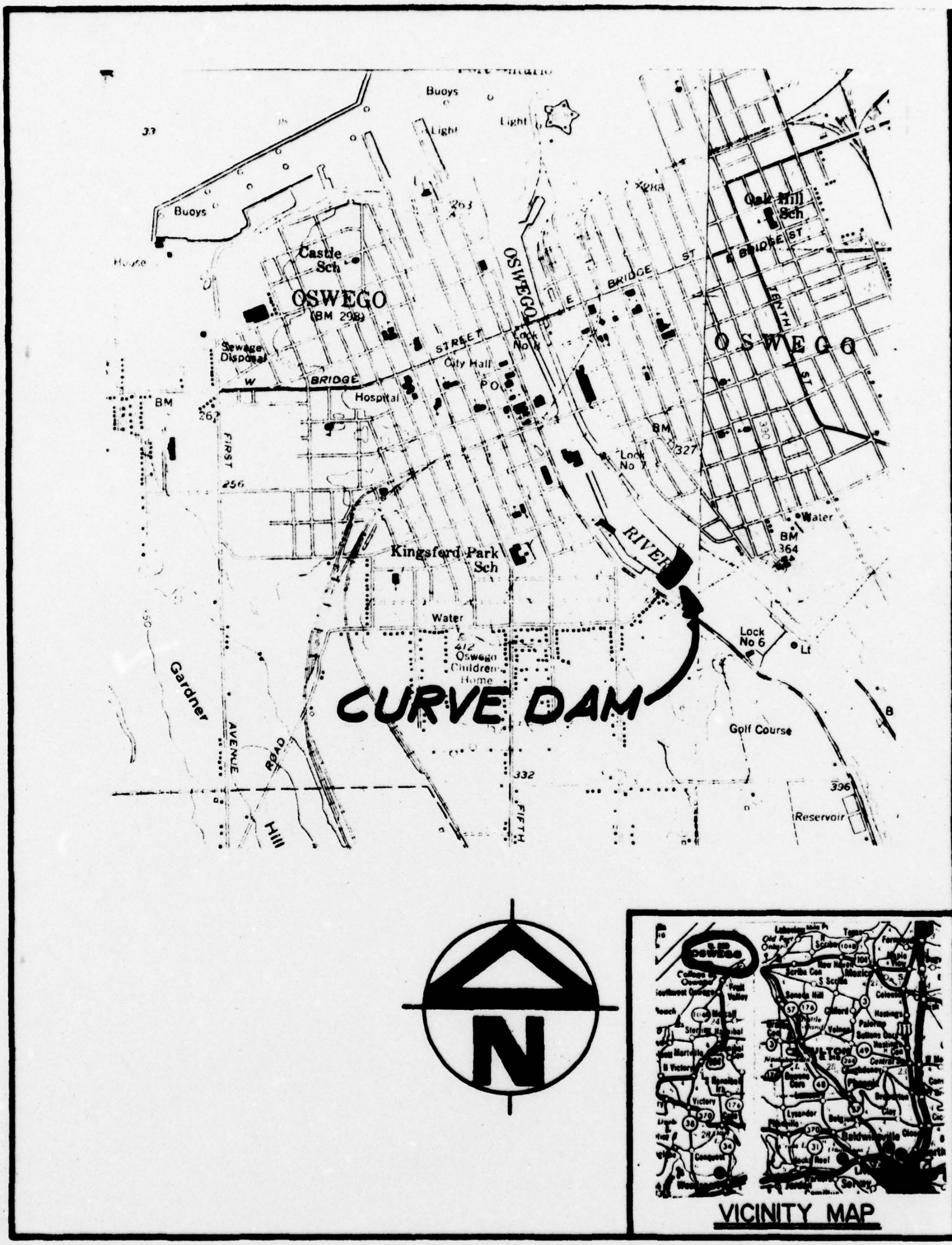
a. Results of the aforementioned investigations will determine the remedial measures required.

The following improvement needs have been identified:

1. Seepage and leaks through and beneath the dam should be repaired.

2. The east abutment masonry units should be aligned and the missing masonry unit replaced.

3. The boil on the riverside wall of the navigation channel should be investigated and the condition corrected.



LOCATION PLAN

FIGURE 1

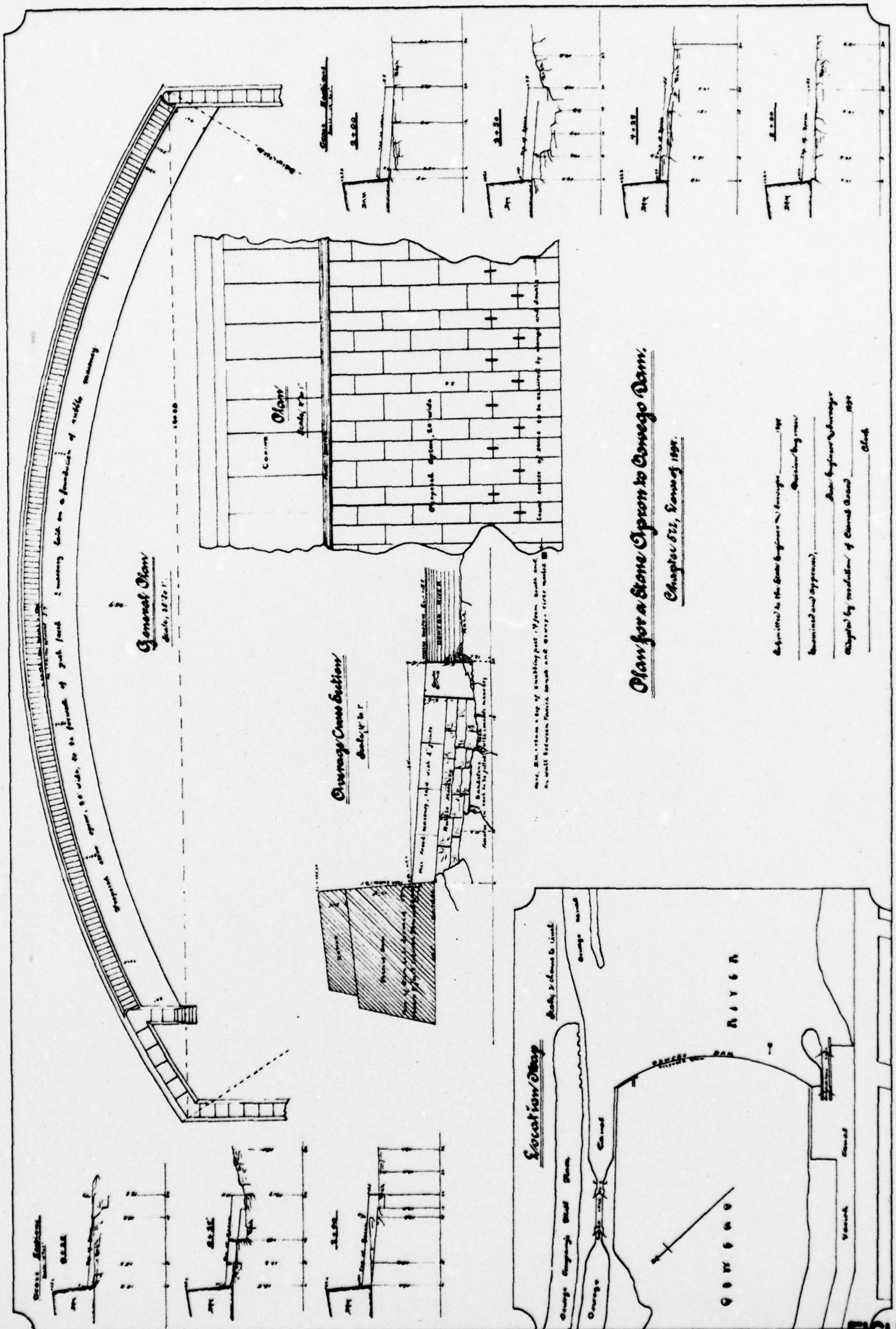
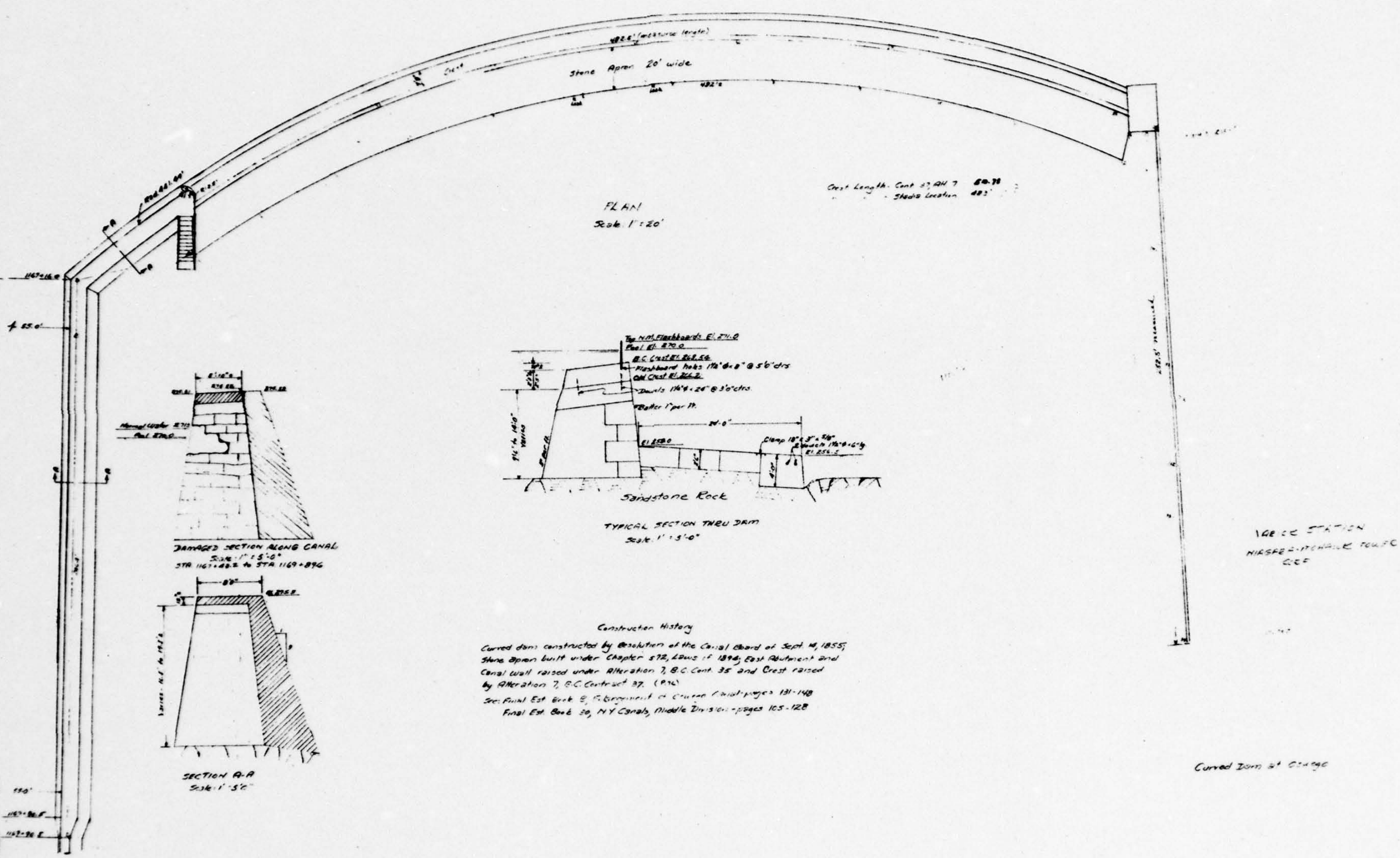

Plan for a Stone Apron to Oswego Dam.
Chapter 572, Laws of 1891.
General Plan
Average Cross Section
Plan
Location Map
Cross Sections
River

FIGURE 2



PLAN
Scale 1" = 20'
Stone Apron 20' wide
Crest Length: Cont. 37, Alt. 7
Stadia Location
TYPICAL SECTION THRU DAM
Scale 1" = 3'-0"
Top N.M. Flashboards El. 271.0
Pool El. 270.0
B.C. Crest El. 268.54
Flashboard holes 1½" × 8" @ 5'6" ctrs
Old Crest El. 266.2
Dowels 1¼" × 24" @ 3'0" ctrs.
Batter 1" per ft.
24'-0"
Clamp 18" × 3" × 5/8"
El. 256.5
Sandstone Rock
DAMAGED SECTION ALONG CANAL
Scale 1" = 5'-0"
STA 1167+48.2 to STA 1169+89.6
SECTION A-A
Scale 1" = 5'0"
Construction History
Curved dam constructed by Resolution of the Canal Board of Sept. 14, 1855;
Stone Apron built under Chapter 572, Laws of 1894; East Abutment and
Canal Wall raised under Alteration 7, B.C. Cont. 35 and Crest raised
by Alteration 7, B.C. Contract 37. (P.76)
See: Final Est. Book 8, Enlargement of Erie Canal - pages 131-148
Final Est. Book 30, N.Y. Canals, Middle Division - pages 105-128
Curved Dam at Orange

FIGURE 3

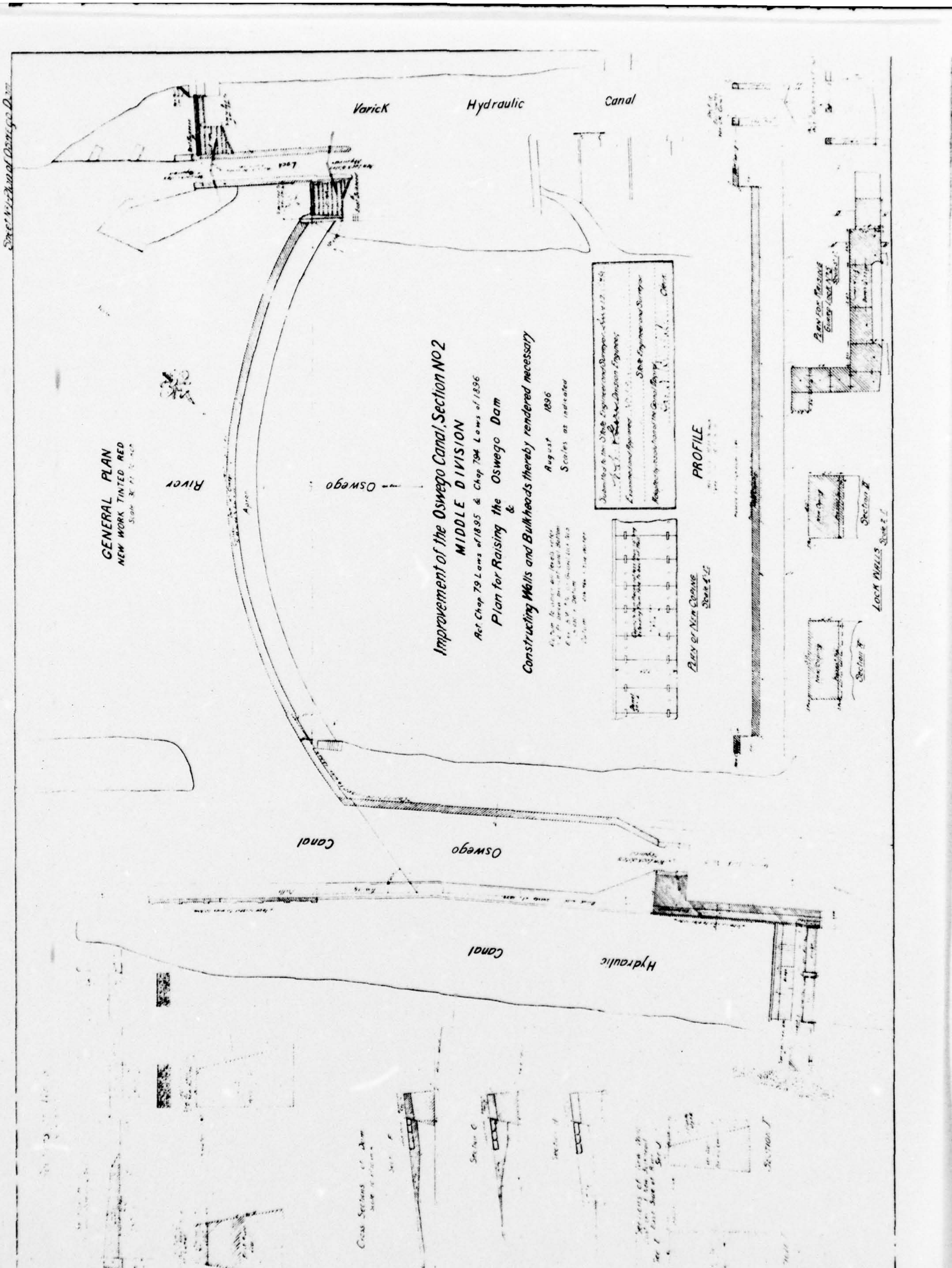
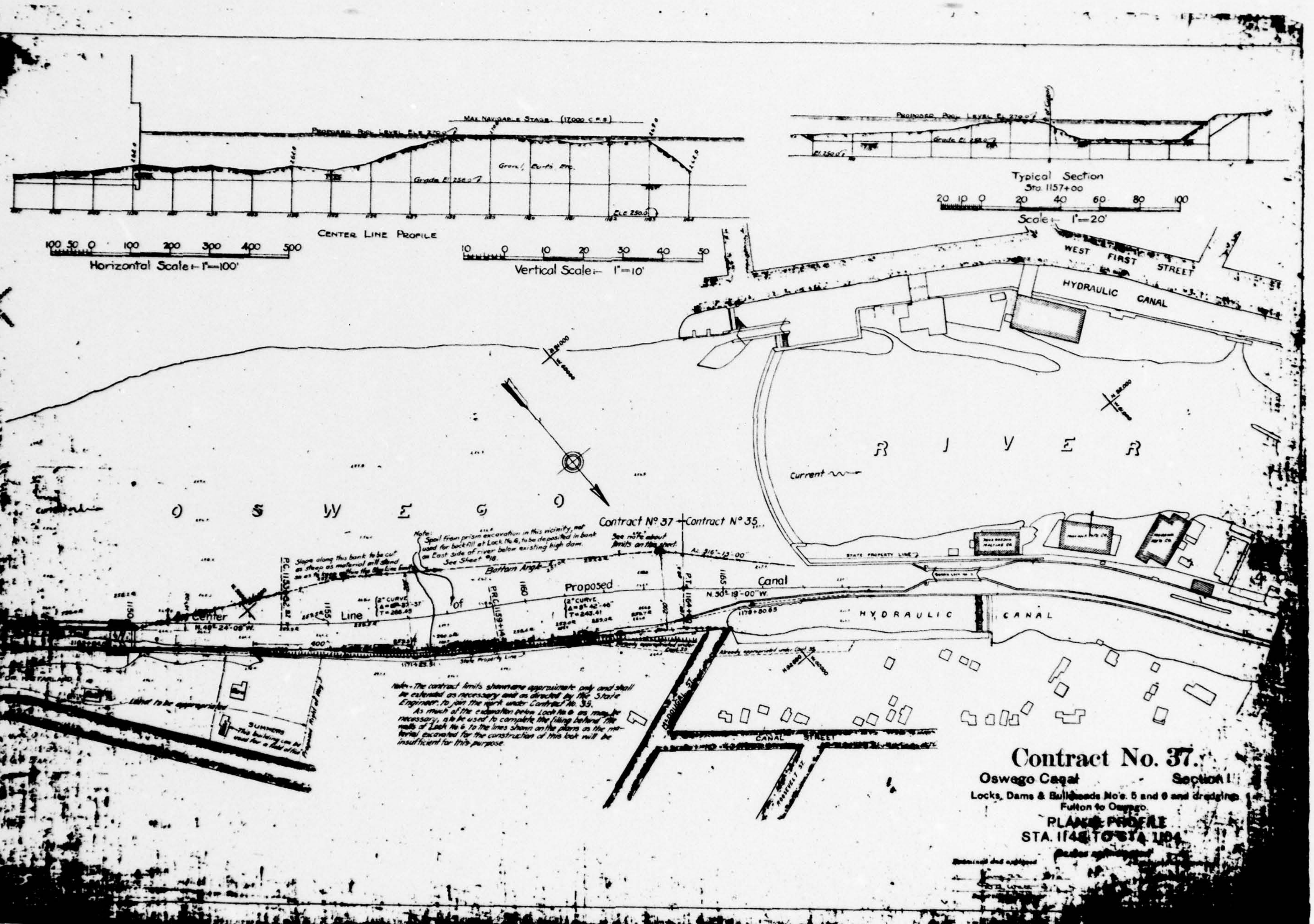

Improvement of the Oswego Canal, Section No 2
MIDDLE DIVISION
Ref. Chap 79 Laws of 1895 & Chap 794 Laws of 1896
Plan for Raising the Oswego Dam
&
Constructing Walls and Bulkheads thereby rendered necessary
August 1896
Scales as indicated
GENERAL PLAN
NEW WORK TINTED RED
Varick
Hydraulic
Canal
River
Oswego
Oswego
Canal
Canal
Hydraulic
PROFILE
Plan of New Coping
Section II
LOCK WALLS

FIGURE 4



Typical Section
Sta. 1157+00
Scale:- 1"=20'
Center Line Profile
Horizontal Scale:- 1"=100'
Vertical Scale:- 1"=10'
West First Street
Hydraulic Canal
River
Current
Oswego
Contract No. 37
Contract No. 35
Center Line of Proposed Canal
Bottom Angle
N. 30° 19'-00" W.
N. 48° 24'-09" W.
State Property Line
Canal Street
Summons
Land to be appropriated
Note:- The contract limits shown are approximate only and shall be extended as necessary and as directed by the State Engineer, to join the work under Contract No. 35.
As much of the excavation below Lock No. 6 as may be necessary, is to be used to complete the filling behind the walls of Lock No. 6 to the lines shown on the plans as the material excavated for the construction of this lock will be insufficient for this purpose.
Contract No. 37.
Oswego Canal
Section I
Locks, Dams & Bulkheads No's. 5 and 6 and dredging
Fulton to Oswego.
Plan & Profile

FIGURE 5

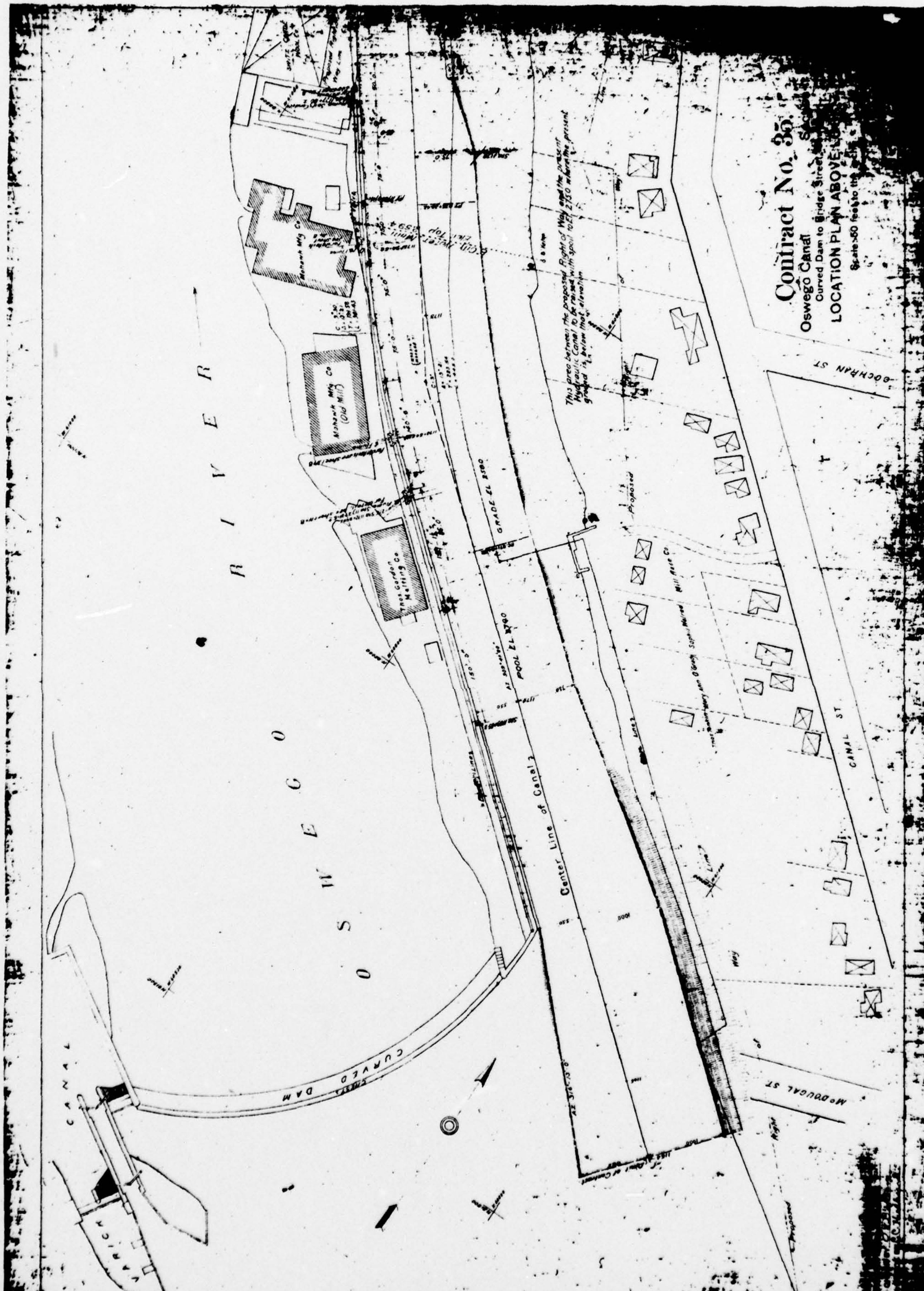
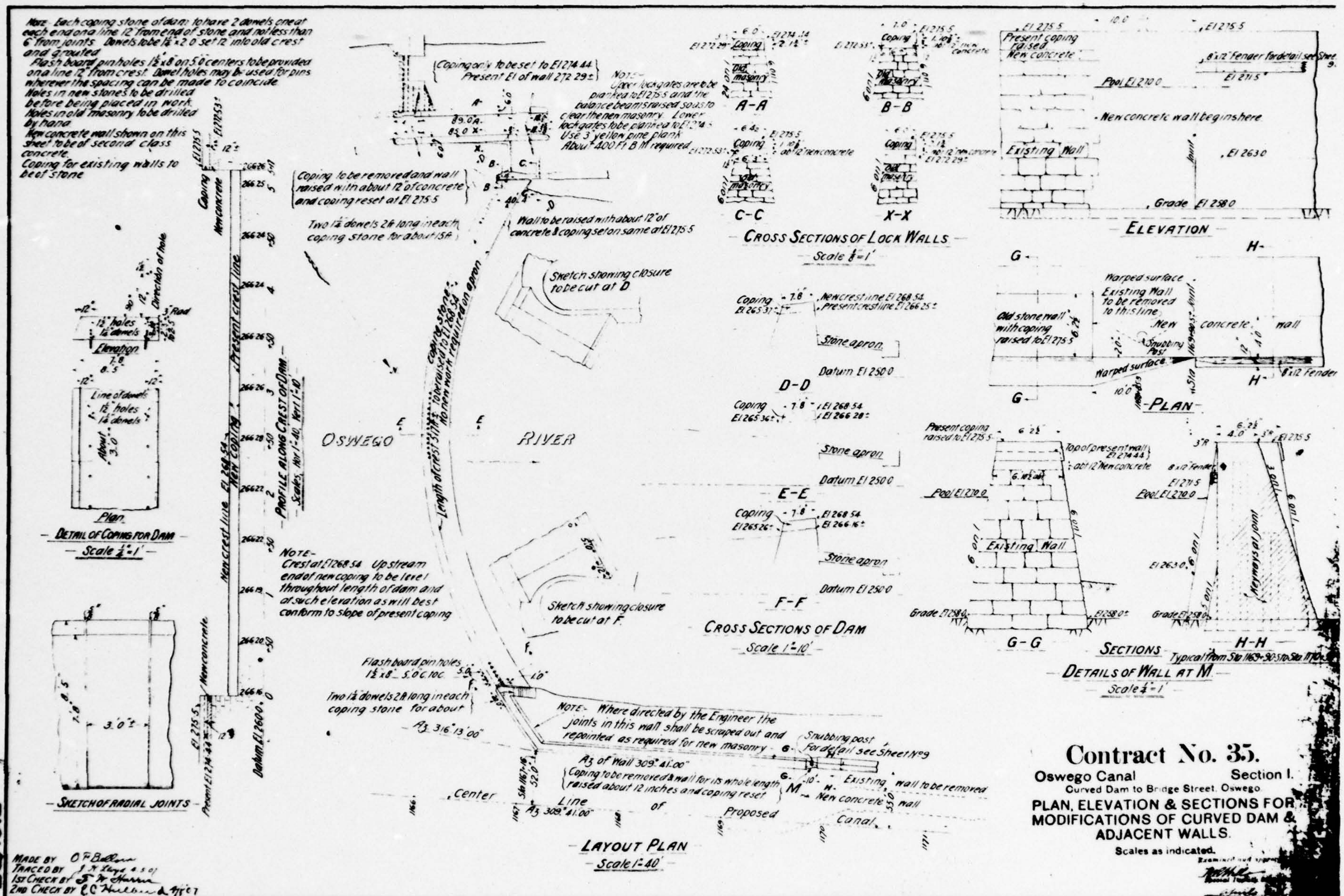
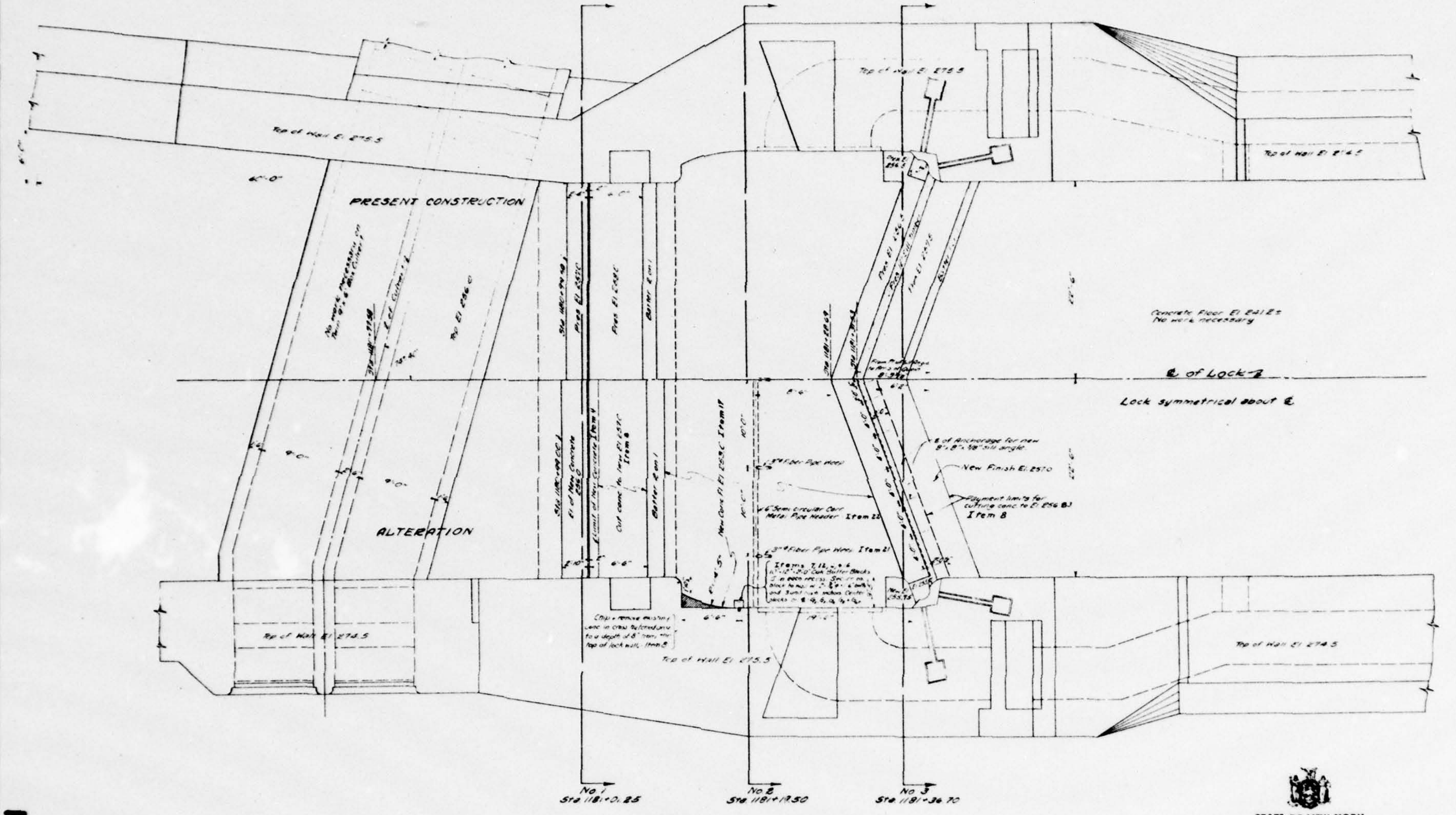

Contract No. 35
Oswego Canal
Curved Dam to Bridge Street
LOCATION PLAN ABOVE
OSWEGO
RIVER
CURVED DAM
CANAL
Center Line of Canal
CANAL ST
COCHRAN ST
McDOUGAL ST
Mohawk Mfg Co (Old Mill)
Proposed

FIGURE 6



Note- Each coping stone of dam to have 2 dowels one at each end on a line 12" from end of stone and not less than 6" from joints. Dowels to be 1½" x 2.0 set 12" into old crest and grouted.
Flash board pin holes 1½" x 8" on 5.0 centers to be provided on a line 12" from crest. Dowel holes may be used for pins wherever the spacing can be made to coincide.
Holes in new stones to be drilled before being placed in work.
Holes in old masonry to be drilled by hand.
New concrete wall shown on this sheet to be of second class concrete.
Coping for existing walls to be of stone.
Coping only to be set to El 274.44. Present El of wall 272.29±
Coping to be removed and wall raised with about 12" of concrete and coping reset at El 275.5
Two 1½" dowels 2 ft long in each coping stone for about 15 ft.
Wall to be raised with about 12" of concrete & coping set on same at El 275.5
NOTE- Upper lock gates are to be planked to El 275.5 and the balance beams raised so as to clear the new masonry. Lower lock gates to be planked to El 274.5. Use 3" yellow pine plank. About 400 Ft B M required.
A-A
B-B
C-C
X-X
CROSS SECTIONS OF LOCK WALLS
Scale ⅛"=1'
ELEVATION
Present coping raised
New concrete
Pool El 270.0
New concrete wall begins here
Existing Wall
Grade El 258.0
8"x12" Fender for detail see Sheet 9.
PLAN
Old stone wall with coping raised to El 275.5
Warped surface
Existing Wall to be removed to this line
New concrete wall
Snubbing Post
8"x12" Fender
Sketch showing closure to be cut at D.
Sketch showing closure to be cut at F.
OSWEGO
RIVER
Length of crest 317 ft to be raised to El 268.54. Coping stone. No new work required on apron
Coping
New crest line El 268.54
Present crest line El 266.25±
Stone apron
Datum El 250.0
D-D
E-E
F-F
CROSS SECTIONS OF DAM
Scale 1"=10'
G-G
H-H
SECTIONS
Typical from Sta 1169+50 to Sta 1170+
DETAILS OF WALL AT M.
Scale ¼"=1'
Present coping raised to El 275.5
Top of present wall El 274.44
ab't 12" New concrete
Pool El 270.0
Existing Wall
Grade El 258.0
Keyways at joint
PROFILE ALONG CREST OF DAM
Scales, Hor 1"=40, Vert 1"=10
New crest line El 268.54
New coping
Present crest line
New concrete
Datum El 260.0
NOTE- Crest at El 268.54. Upstream end of new coping to be level throughout length of dam and at such elevation as will best conform to slope of present coping.
DETAIL OF COPING FOR DAM
Scale ½"=1'
Plan
Elevation
Line of dowels
1½" holes
1½" dowels
Direction of hole
SKETCH OF RADIAL JOINTS
Flash board pin holes 1½" x 8" 5.0 c to c
Two 1½" dowels 2 ft long in each coping stone for about
A_3 316° 13' 00"
NOTE- Where directed by the Engineer the joints in this wall shall be scraped out and repointed as required for new masonry.
A_3 of Wall 309° 41' 00"
Coping to be removed & wall for its whole length raised about 12 inches and coping reset.
Snubbing post For detail see Sheet No 9
Existing wall to be removed
New concrete wall
Center Line of Proposed Canal
LAYOUT PLAN
Scale 1"=40'
Contract No. 35.
Oswego Canal
Section I.
Curved Dam to Bridge Street, Oswego.
PLAN, ELEVATION & SECTIONS FOR MODIFICATIONS OF CURVED DAM & ADJACENT WALLS.
Scales as indicated.
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

FIGURE 7



PLAN ~ UPPER END OF LOCK 7, OSWEGO CANAL

Scale: 1" = 5 Ft.

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BARGE CANAL IMPROVEMENT
CHAPTER 688, LAWS OF 1934 AS AMENDED

CONTRACT U.S. 101

For New Gates and Lowering Upper Sill & Miscellaneous Work at Lock O-7

OSWEGO CANAL

Oswego County New York

3 of 11

FIGURE 8 F

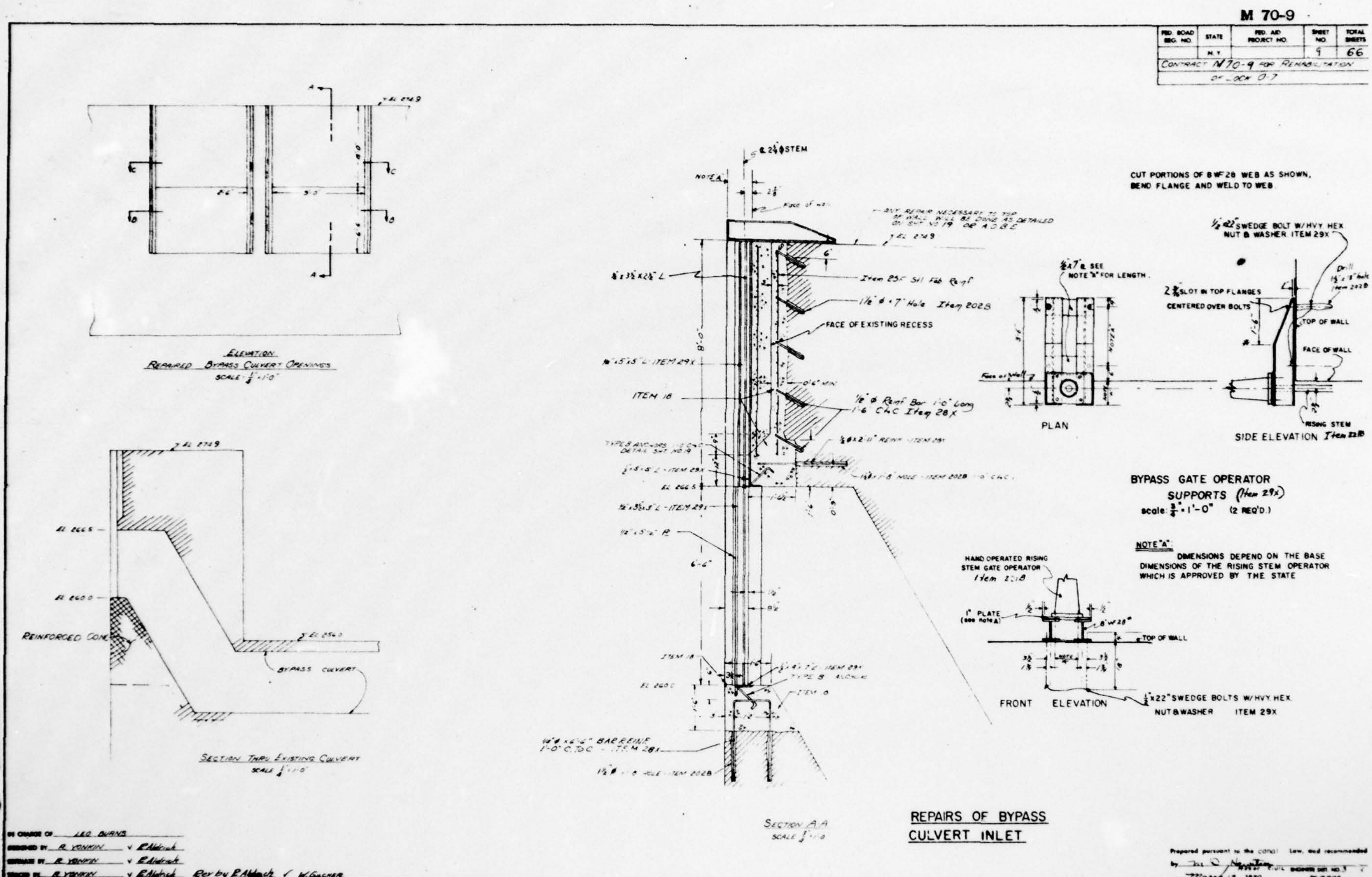

M 70-9
FED. ROAD REG. NO. | STATE N.Y. | FED. AID PROJECT NO. | SHEET NO. 9 | TOTAL SHEETS 66
CONTRACT M70-9 FOR REHABILITATION OF LOCK O-7
ELEVATION
REPAIRED BYPASS CULVERT OPENINGS
SECTION THRU EXISTING CULVERT
REINFORCED CONC.
BYPASS CULVERT
SECTION A-A
CUT PORTIONS OF 8WF28 WEB AS SHOWN, BEND FLANGE AND WELD TO WEB.
FACE OF EXISTING RECESS
PLAN
SIDE ELEVATION
TOP OF WALL
FACE OF WALL
RISING STEM
BYPASS GATE OPERATOR SUPPORTS
scale: 3/4" = 1'-0" (2 REQ'D.)
NOTE "A": DIMENSIONS DEPEND ON THE BASE DIMENSIONS OF THE RISING STEM OPERATOR WHICH IS APPROVED BY THE STATE
HAND OPERATED RISING STEM GATE OPERATOR
FRONT ELEVATION
SWEDGE BOLTS W/HVY. HEX. NUT & WASHER ITEM 29X
REPAIRS OF BYPASS CULVERT INLET
IN CHARGE OF LEO BURNS
DESIGNED BY R. YONKIN
DRAWN BY R. YONKIN
TRACED BY R. YONKIN
Rev by R. Aldrich / W. Gucher

FIGURE 9

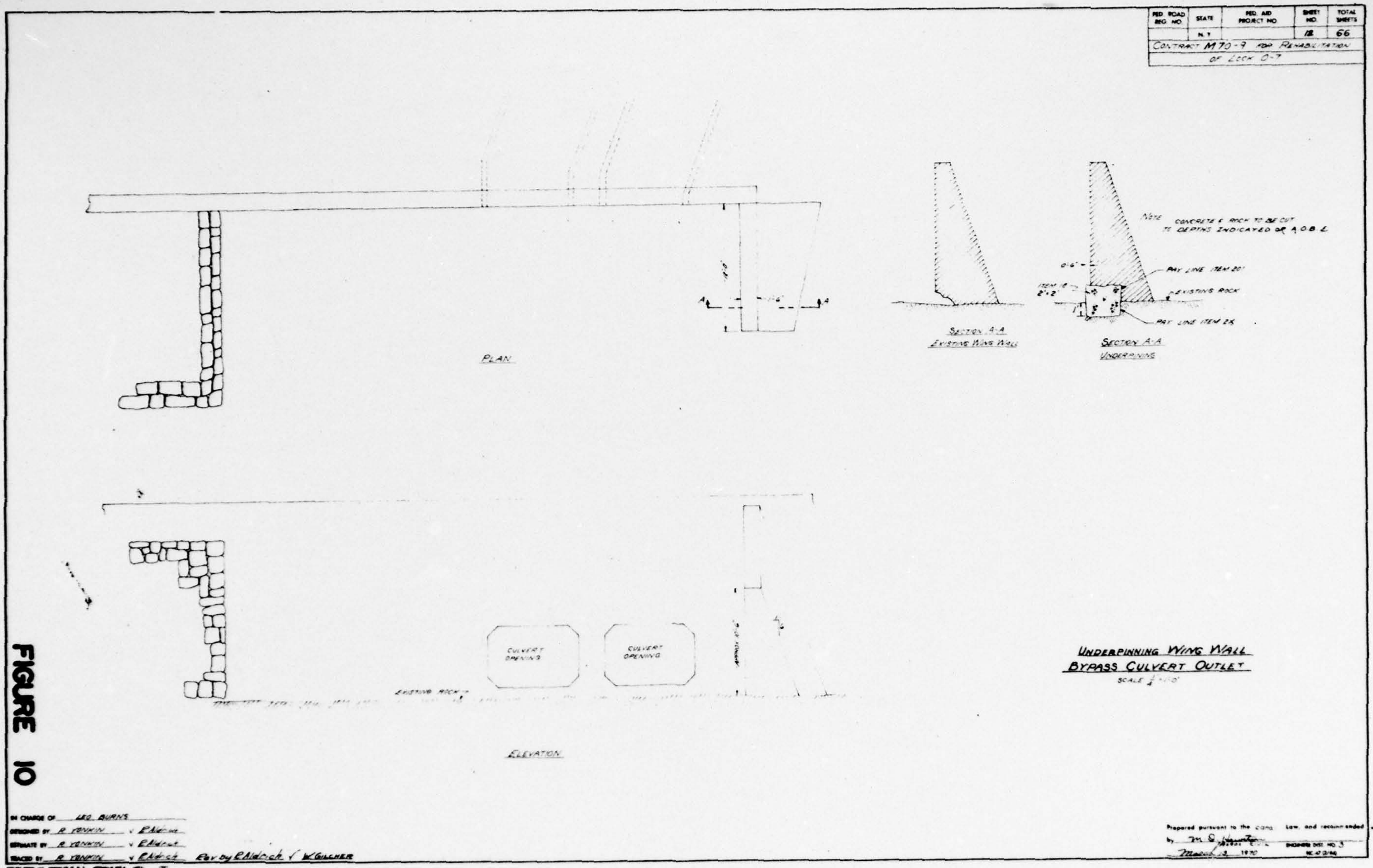

FED ROAD REG NO
STATE
N.Y.
FED. AID PROJECT NO
SHEET NO. 12
TOTAL SHEETS 66
CONTRACT M70-9 FOR REHABILITATION OF LOCK O-7
NOTE CONCRETE & ROCK TO BE CUT TO DEPTHS INDICATED OR A.O.B.E.
PAY LINE ITEM 20
EXISTING ROCK
PAY LINE ITEM 2X
SECTION A-A
EXISTING WING WALL
SECTION A-A
UNDERPINNING
PLAN
CULVERT OPENING
CULVERT OPENING
EXISTING ROCK
ELEVATION
UNDERPINNING WING WALL
BYPASS CULVERT OUTLET
IN CHARGE OF LEO BURNS
DESIGNED BY R. YENKIN
ESTIMATE BY R. YENKIN
TRACED BY R. YENKIN
Rev by R Aldrich / W Gilcher
Prepared pursuant to the Canal Law, and recommended
March 13, 1970
ENGINEERING DIST. NO. 3

FIGURE 10

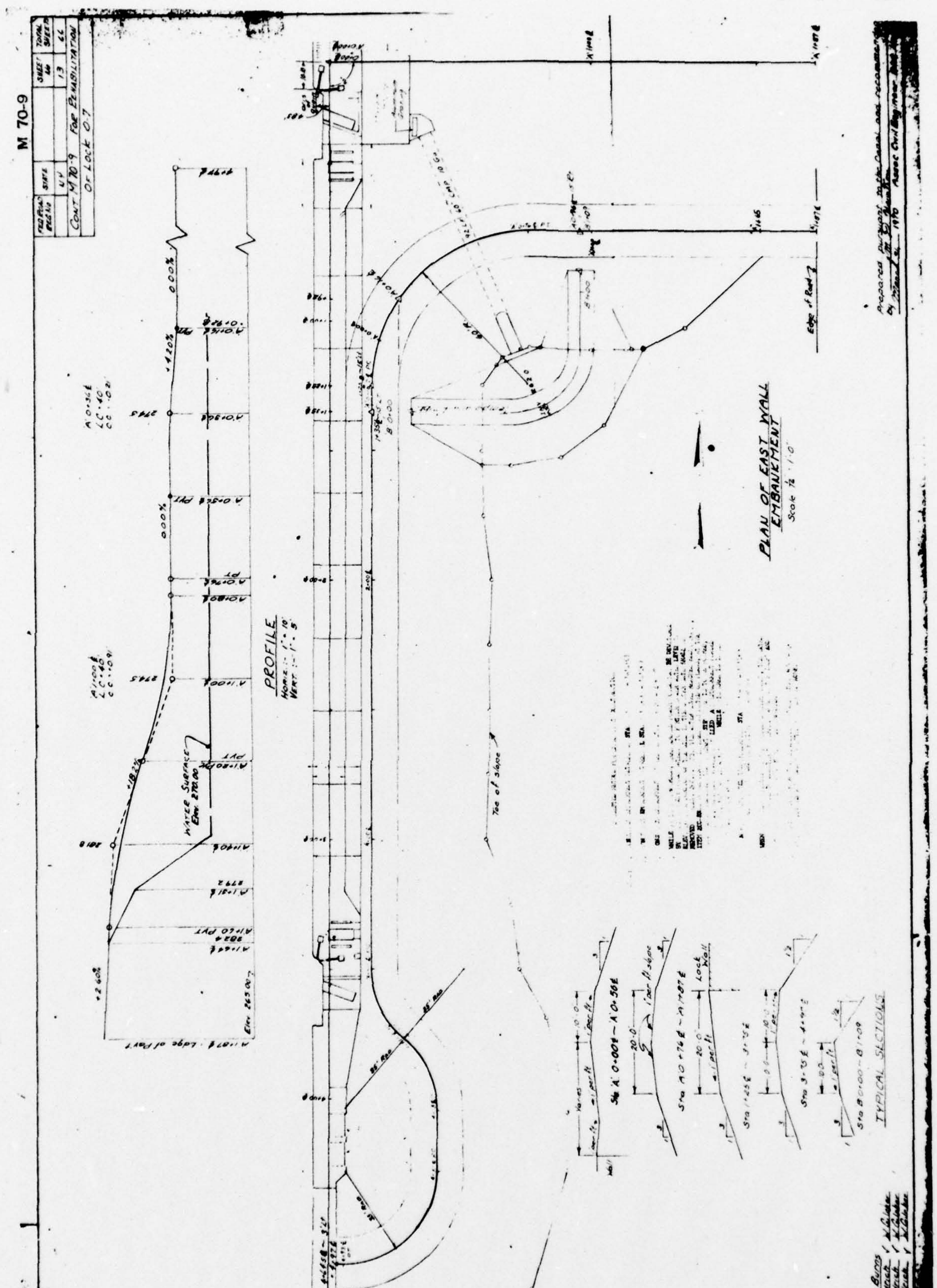

M 70-9
CONT M 70-9 FOR REHABILITATION OF LOCK 07
PROFILE
WATER SURFACE
PLAN OF EAST WALL EMBANKMENT
Toe of Slope
Edge of Road
TYPICAL SECTIONS

FIGURE 11

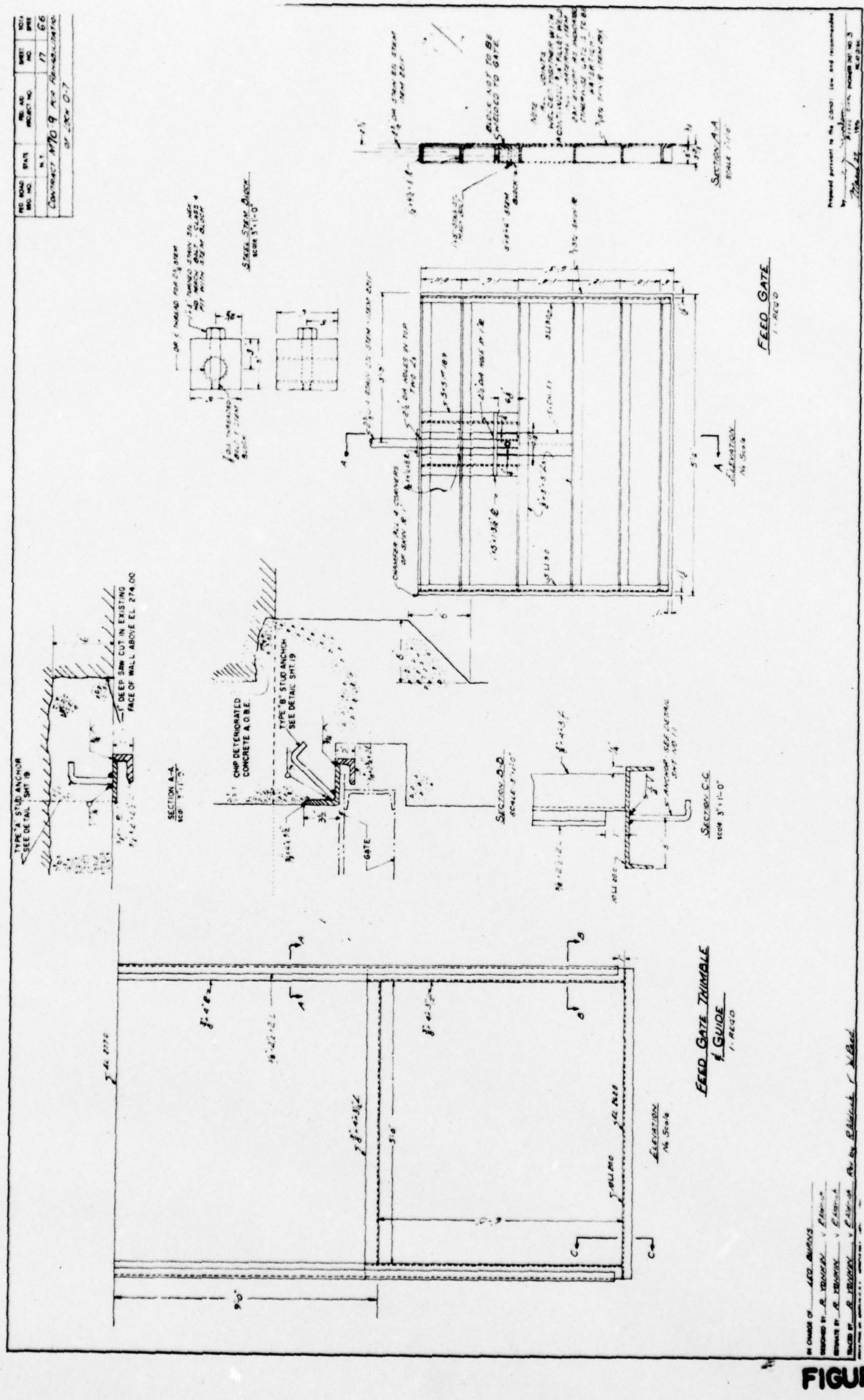
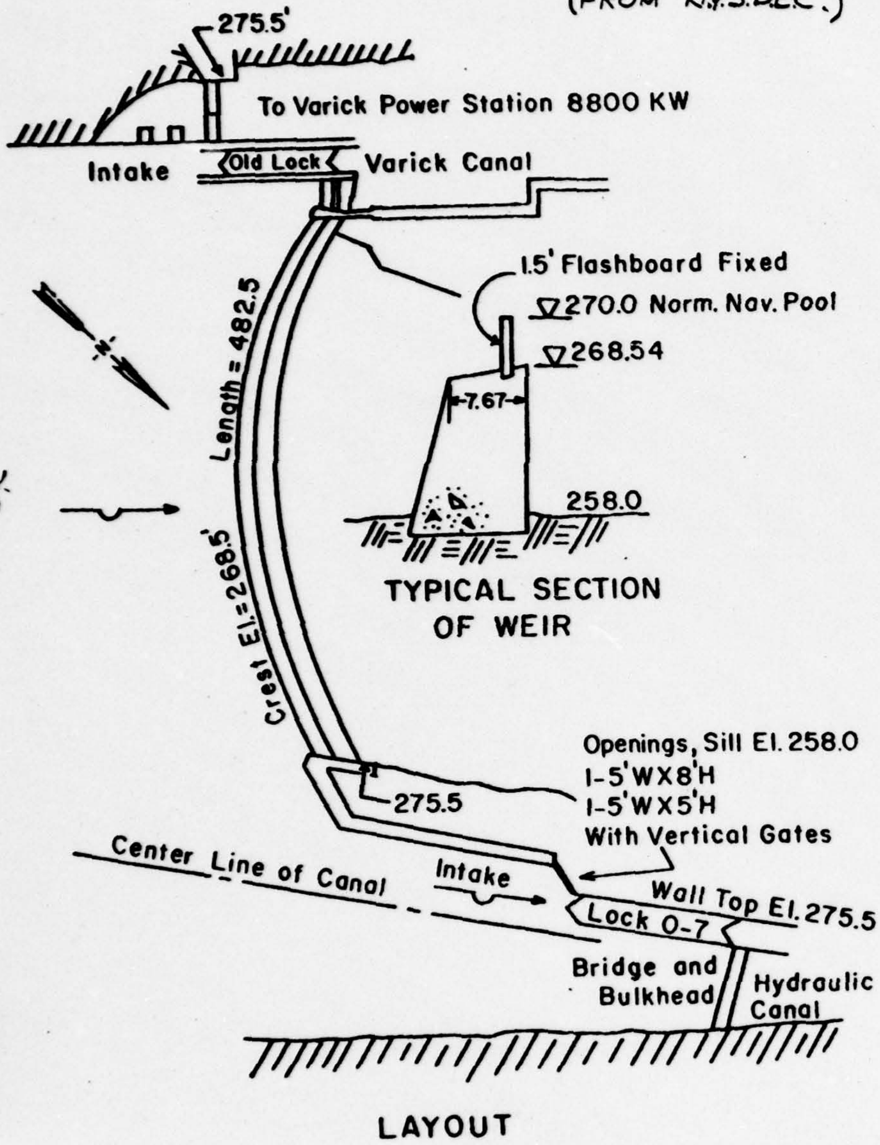

FEED GATE THIMBLE & GUIDE
FEED GATE
ELEVATION
No Scale
SECTION A-A
SECTION B-B
SECTION C-C
STEEL STEM BLOCK
TYPE "A" STUD ANCHOR SEE DETAIL SHT 19
TYPE "B" STUD ANCHOR SEE DETAIL SHT 19
CHIP DETERIORATED CONCRETE A.O.B.E.
1" DEEP SAW CUT IN EXISTING FACE OF WALL ABOVE EL 274.00
GATE

FIGURE 12

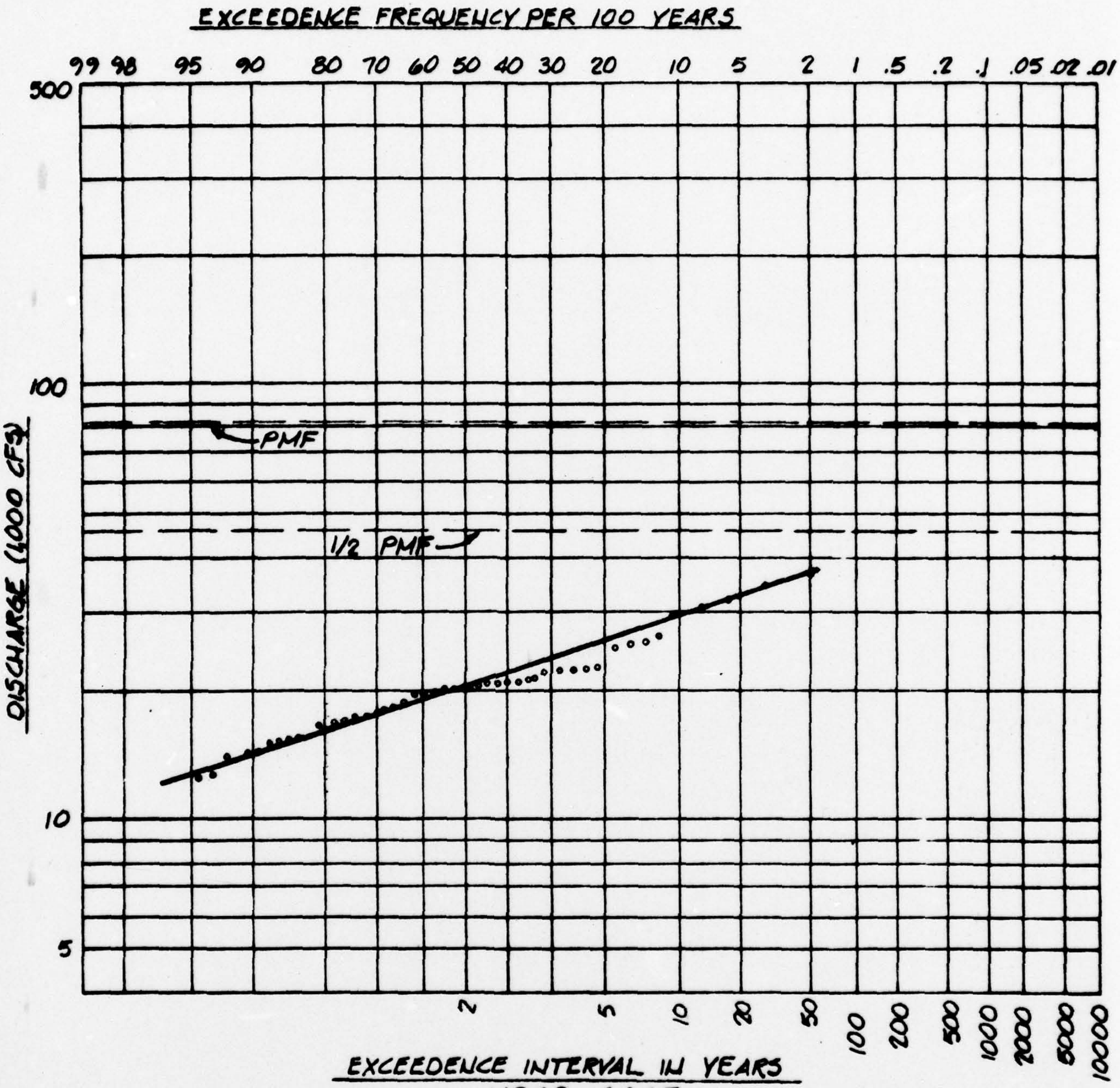
CONTROL STRUCTURE AT LOCK O-7, OSWEGO

(FROM N.Y.S.DEC.)



3(a)

FIGURE 13



USGS GAGE
STATION 04249000
TOTAL DRAINAGE AREA = 5121 SQ MI
GAGE DATUM = 246.0 FT
PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY CURVE

STETSON • DALE	DATE 6.28.79	DRAWN JPG	OSWEGO RIVER LOCK #7
	JOB 2305	FIGURE 14	

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Lower Oswego (Curved Dam) at Lock 7 **County** Oswego **State** New York **ID #** 398

Type of Dam Masonry Gravity Overflow **Hazard Category** High

Date(s) Inspection (1) May 31, 1979 (2) June 7, 1979 **Weather** Sunny **Temperature** 70's

Pool Elevation at Time of Inspection (1) 271.7 (2) 265 M.S.L.* **Tailwater at Time of Inspection** (1) 256.90* (2) Dry bedrock

Use of Dam: Hydro Power, Navigation **Lifts:** Lock 8 to 7 10.8 feet

This inspection does not pertain to an independent evaluation of the condition of the lock or hydropower facility.

Inspection Personnel:

(1),(2) F.W. Byszewski - Stetson-Dale	(1),(2) Richard Aldrich	N.Y.S.D.O.T., Region 3
(1),(2) N.F. Dunlevy - Stetson-Dale	(2) Robert McCarty	N.Y.S.D.E.C., Dam Safety Section
(1), (2) D.F. McCarthy - Stetson-Dale		
(1), (2) H. Muskatt - Stetson-Dale		

*Barge Canal Datum (USGS + 0.99 feet)

N. F. Dunlevy Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Seepage observed at a number of locations through the masonry. These locations were in the center 2/3 of the dam and the point where the wall meets the apron and three-four feet above the apron on the wall.	The water level was lowered below the spillway crest so that the flashboards could be replaced. Therefore the head was at or near the spillway crest at the time of observation.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Some movement of the layed up stone work was observed. A stone just beyond the apron is missing and this may be the cause of the movement.	
DRAINS	None observed.	
WATER PASSAGES	Water passages are not located in the dam section but are found in the lock area on the east side of the river and at the hydropower station on the west side.	
FOUNDATION	Two boils were observed in the center of the dam just beyond the apron. This area is entirely bedrock. No other foundation problems observed.	These conditions observed with the spillway in a non-overflow condition.

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	The dam section contains no concrete surfaces. The navigation channel approaching the lock has some seepage and and spalled concrete surfaces. Minor seepage was observed in the wall midway along the upstream channel on the river side.	The navigation channel below the lock has a deteriorated wall adjacent to the municipal parking lot. The downstream lock abutment wall has cracks and spalling, some movement noted. This area seems to have a lot of people milling about since it's located in the middle of the city.
STRUCTURAL CRACKING	None observed in spillway area of dam.	Comments are pertinent to use of space during operating conditions with limited hazard to navigation system users and fishermen in the area as well as limited of downtown area by residents of community.
VERTICAL & HORIZONTAL ALIGNMENT	Good alignment observed. No visible signs of instability observed.	
MONOLITH JOINTS	None.	
CONSTRUCTION JOINTS	See Sheet 1 for elevations.	
STAFF GAGE OF RECORDER		

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A.	
RIPRAP FAILURES	N/A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A.	
ANY NOTICEABLE SEEPAGE	N/A.	
STAFF GAGE AND RECORDER	N/A.	
DRAINS	N/A.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR (overflow spillway across face of dam)	Seepage noted, thru and below weir noted, some limited movement and separation observed.	Seepage should be eliminated.
APPROACH CHANNEL	Pool area of dam.	Flashboards are used to raise pool elevation for hydro production.
DISCHARGE CHANNEL	Founded on bedrock.	
BRIDGE AND PIERS	None across dam.	

GATED SPILLWAY

Exists with hydropower station. Reservoir cannot be entirely drawn down without damage to power station or locks.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	No observations.	
APPROACH CHANNEL	No observation.	
DISCHARGE CHANNEL	No observations.	
BRIDGE AND PIERS	No observations.	
GATES AND OPERATION EQUIPMENT	No observations.	

OUTLET WORKS

Same comment as for gated spillway.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	No observations.	
INTAKE STRUCTURE	No observations.	
OUTLET STRUCTURE	No observations.	
OUTLET CHANNEL	No observations.	
EMERGENCY GATE	No observations.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Clear, unobstructed channel.	
SLOPES	Navigable waterway. Dam 0.7 miles from Lake Ontario.	
APPROXIMATE NO. OF HOMES AND POPULATION	Center City of Oswego streets slope towards river. Not a wide flood flow area.	Threshold of property damage estimated at 5-10 feet above river.
	Type of improvements in floodway	-marina -occupied dwellings -industrial buildings -commercial buildings
	Loss of life potential - likely greater than 4. Economic loss potential less than $1,000,000 Hazard During Operational Period	High Hazard recommendation. Appreciable Economic Loss Recommendation. Recreational Boating, Fishing along shoreline.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	None observed.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	River located in shallow gorge Rock outcropping exists on all sides.	No opportunity for landslides.
SEDIMENTATION	No noticeable siltation in lake.	

NAME OF DAM Lower Oswego (Curved D

ID # 398

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

ITEM	REMARKS
AS-BUILT DRAWINGS	Exists and included in report.
REGIONAL VICINITY MAP	Exists and included in report.
CONSTRUCTION HISTORY	Exists and included in report.
TYPICAL SECTIONS OF DAM	Exists and included in report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	Exists and included in report.
RAINFALL/RESERVOIR RECORDS	Exists and included in report.

ITEM	REMARKS
DESIGN REPORTS	None.
GEOLOGY REPORTS	None.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	See Report.
BORROW SOURCES	N/A.

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	See report for some data.
HIGH POOL RECORDS	No data.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported.
MAINTENANCE OPERATION: RECORDS	See report for information provided.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See report.
OPERATING EQUIPMENT PLANS & DETAILS	See report.
GENERAL DESCRIPTION OF OPERATING PROCEDURES	Lock operated by N.Y.S.D.O.T. Hydro Power by Niagara Mohawk. Dam owned by N.Y.S.D.O.T. Operation procedures are documented by N.Y.S.D.O.T. Lock operates 15 April to 30 November. Hours 7:00 a.m. to 10:30 p.m. for recreational, and 24 hours for commercial. Lock has been closed only once due to high river discharges
INSPECTION PROGRAM	Inspection performed and report prepared bi-annually by N.Y.S.D.O.T. Maintenance provided when needed by the department.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 5100 square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): w/flashboards (Nav.Season) 290.8
w/o flashboards (Winter Seas.) 290.0

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ----

ELEVATION MAXIMUM DESIGN POOL: ----

ELEVATION TOP DAM: 275.6*

CREST: Barge Canal Datum (USGS + 0.99 feet)

a. Elevation w/o flashboards 268.5
w/flashboards 271.0
b. Type Overflow masonry
c. Width 7.67 feet
d. Length 482.5 feet
e. Location Spillover Center of dam
f. Number and Type of Gates none

OUTLET WORKS:

a. Type Through power house, maximum drawdown capacity 6800 cfs
b. Location west side of river
c. Entrance Inverts ----
d. Exit Inverts ----
e. Emergency Draindown Facilities peak 6800 cfs, cannot draw completely down.

HYDROMETEOROLOGICAL GATES:

a. Type ----
b. Location ----
c. Records ----

MAXIMUM NON-DAMAGING DISCHARGE: 40,000 cfs (estimated)

*B.C. Datum

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

" U.S. 90A
" U.S. 101

Lower Pool 255.80 Upper Mitre Sill 257.0

Upper Pool 270.00 Lower Mitre Sill 242.5

6 x 8 valves

1928 - Gate house painted, Buffer beams painted.

1930 - Checker plates on anchor recesses. Anchors set for gate "A" frames.

1931 - Raised capstans from sumps. Installed Lock signal lights and placed angles on wall for wire. Reset buffer beam stop casting at So. end. Unwatered-new rails, wheels, cup and saucer castings under lower gates. Placed conc. floor in bottom of lock chamber. Painted gate house.

1933 - Overhauled generator nearest door-Shaft machined at shop and new bearings installed. Conc. placed on floor of wheel pit.

1938 - New shaft installed on #2 turbine.

1939 - Gate spars replaced with heavier type.

1941-2 - Lock completely rewired.

1944 - #2 turbine overhauled and balanced.

1945 - Additional snub posts placed along Up. app. wall.
1946 - Valves replaced also new seating rails. 2 new light poles placed lower end.
1947 - Waste gates-up end repaired and reinstalled.
1948 - One Gen. & turbine overhauled. Gate & valve motors overhauled. Light poles cut down, new lamps installed-poles rewired.
1949 - Pier light on Up. app. connected to Lock power, tops of several sections of wall resurfaced with up to 2 ft. of new conc.
1950 - Lower gates overhauled-gates painted. New anchor rod exten., New Upper sills.
1951 - Unwatered, valves overhauled, lower sills repaired, gates painted, new rub sticks, new buffer beam at Up. end, New Lock House, new septic tank.
1953 - Gate & Valve motors overhauled, new mot. base up left gate, repaired Lock walls on lower Rt. valve also upper right & left valve with reinf. conc.-Removed old head gates on Up. end of lock and rebuilt walls with reinf. conc.-Installed new storm windows for Lock house. Boxed in and insulated all heat runs. Connected new oil heat plant.-New pier light on upper wall.-Plugged waterpower open. above Lk.
1954 - New operating stands, new Up. & Low, gate walks, New stop log for powerhouse. Motors overhauled.
1955 - Heat plant installed-Gate between Lk 7 & 8 repaired. Water wheel repaired. New stop logs.
1956 - Sealed raceway gates. New elect. service cable installed. Limit switches relocated and rewired
1957 - Oil furnaces inst. in lockhouse & powerhouse. Rub sticks replaced. New stop log. Limit switch panels replaced.
1959 - Temporary low gate repairs, powerhouse-new roof & painted. New cable duct E. wall. New work bench. Overhauled Gen. & waterwheels.
1960 - Pumped-rebuilt valves installed, replaced seating rails, cup wheels & valve shafts,

built up Z bars, new chains. Repaired conc. around up valve pits. Rebushed all anchor arms. Touch up paint on gates, painted trash racks. Refaced 150' top of lock wall. New fuel tanks. Replaced rub timbers.

1961 - Contract U.S. 101, New upper sill & steel angle on lower end. Repaired Conc. around anchor arms on lower E. approach wall. Lower approach walls resurfaced. Motors overhauled. ~~Vacuum lines repaired~~. Painted safety railing on W. wall. New parking area. Built curbing & put in new lawn.

1962 - Waterwheels inspected & repaired. 8 motor control panels rewired. Gate machinery rebuilt. Conc. repaired on up. W. wall. Machinery and Motor box raised on upper W. Gate. Trash can enclosures built.

1963 - Up gate mach. raised, valves replaced, seal strips replaced. Conc. around anchor arms repaired.

1964 - Conc. repairs to up. E. appr. wall, new trash racks on powerhouse intakes.

1965 - Conc. repaired around up. & low anchor arms.

1967 - Steel repairs to gate recess.

Form IW31. 11-6-14-1000 (16-1036)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

DAM REPORT

13 Oswego

5/17/1915
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Lower State Dam.

This dam is situated upon the Oswego River (Give name of stream)

in the City ~~Town~~ of Oswego, Oswego County,

~~about~~ in (State distance) ~~from~~ the ~~Village or~~ City of Oswego

The distance down (Up or down) stream from the dam, to the Utica St. Bridge (Give name of nearest important stream or of a bridge)

is about 3/4 miles (State distance)

The dam is now owned by New York State (Give name and address in full)

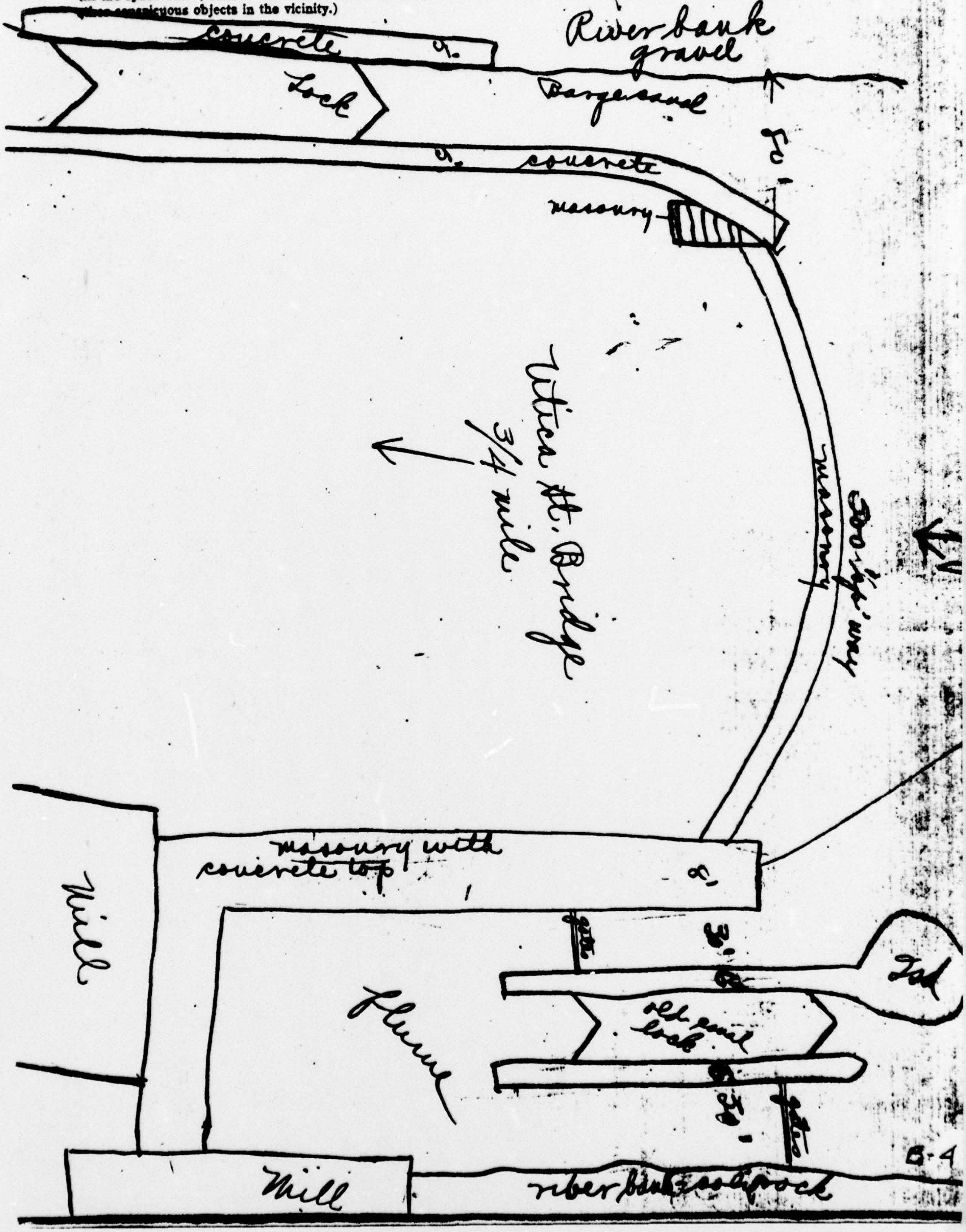
and was built in or about the year 1850, and was extensively repaired or reconstructed during the year 1895 + 1914

As it now stands, the spillway portion of this dam is built of masonry (State whether of masonry, concrete or timber)

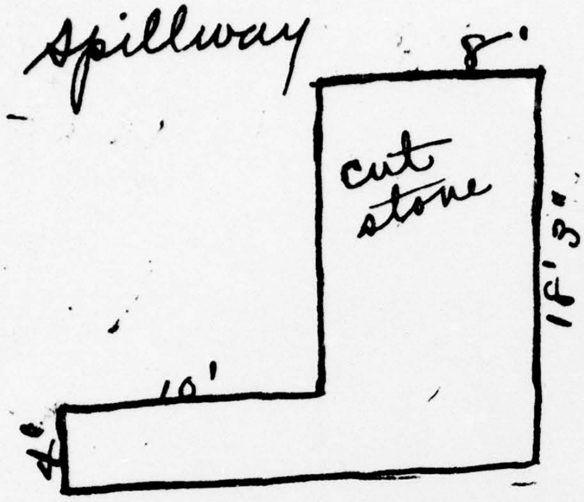
and the other portions are built of masonry and concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

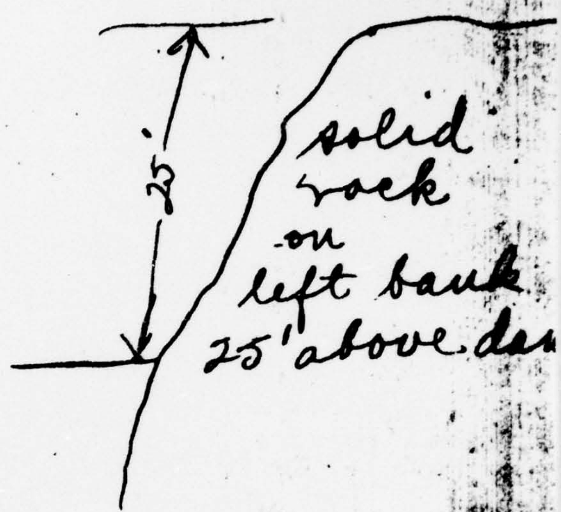
As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is solid rock and under the remaining portions such foundation bed is " "

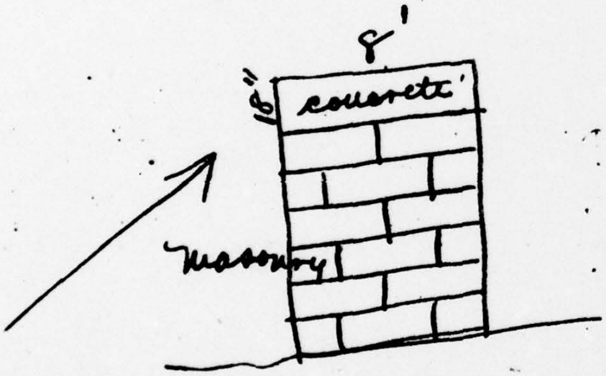
(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)







The total length of this dam is 750 feet. The spillway or waste-weir portion, is about 500 feet long, and the crest of the spillway is about 6 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: head gates to flume 12 - 6' wide + 10 deep

At the time of this inspection the water level above the dam was — ft. 8 in. ~~below~~ above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

This dam is in good condition - no visible leaks or cracks - concrete ~~tops~~ put on masonry on left bank in last two years - all solid and strong

Reported by C. W. H. Douglass
(Signature)

115 Standart St.,
(Address—Street and number, P. O. Box or R. F. D. route)

Syracuse, N.Y.
(Name of place)

B-6

3-22-24-1000 (6-4004)

STATE OF NEW YORK
DEPARTMENT OF
State Engineer and Surveyor
ALBANY

Received Oct 20th 1925 Dam No. 13 Oswego Watershed

Disposition Oct 21 - 1925 Serial No. 653

Foundation inspected

Structure inspected

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the State Engineer, Albany, N. Y., in compliance with the provisions of Chapter LXV of the Consolidated Laws and Chapter 647, Laws of 1911, Section 22 as amended, for the approval of specifications and detailed drawings, marked 6-2; 12-3; 16-2; 20-2; 22-1; and 28-3

herewith submitted for the {construction / reconstruction} of a dam located as stated below. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about twelve months (Date)

1. The dam will be on Oswego River flowing into Lake Ontario in the ~~town~~ City of Oswego, County of Oswego and west end of Curved Dam (Give exact distance and direction from a well-know bridge, dam, village main cross-roads or mouth of a stream)

2. The name and address of the owner is The General Development Corporation, Oswego, N.Y.

3. The dam will be used for Additional spillway section for Curved Dam, as portion of head race for power purposes

4. Will any part of the dam be built upon or its pond flood any State lands? ** See back of sheet

5. The watershed at the proposed dam draining into the pond to be formed thereby is 5,100 sq. miles square miles.

6. The proposed dam will have a pond area at the spillcrest elevation of the same as at present and will impound same as at present cubic feet of water.

7. The lowest part of the natural shore of the pond is as at present feet vertically above the spillcrest; and everywhere else the shore will be at least as at present feet above the spillcrest.

8. The maximum known flow of the stream at the dam site was 27,500 cubic feet per second on April 3,4,5, 1916 (Date)

9. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam damage would be minimized because new structure will replace old structures

10. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) sandstone of very close texture

11. The material of the right bank, in the direction with the current, is ....; at the spillcrest elevation this material has a top slope of .... inches vertical to a foot horizontal on the center line of the dam, a vertical thickness at this elevation of .... feet, and the top surface extends for a vertical height of .... feet above the spillcrest. The proposed structure has no right bank because it joins the State's Curved Dam.

12. The material of the left bank is sandstone; has a top slope of vertical inches to a foot horizontal, a thickness of solid rock feet, and a height of 12 feet. above crest

13 State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. hard, common, close-grained sandstone, impervious, non-water bearing, not affected by exposure to air or water.

14. If the bed is in layers, are the layers horizontal or inclined? horizontal If inclined what is the direction of the horizontal outcropping relative to the axis of the main dam and the inclination and direction of the layers in a plane perpendicular to the horizontal outcropping not inclined

15. What is the thickness of the layers? about two feet

16. Are there any porous seams or fissures? no

17. Wastes. The spillway of the above proposed dam ~~will be~~ is an extension 275' long of Curved Da[m] ~~XXXXXXXX~~ the waters will be held at the right end by a .... the top of which will be .... feet above the spillcrest, and have a top width of .... feet; and at the left end by a .... the top of which will be .... feet above the spillcrest, and have a top width of .... feet.

18. There will be also for flood discharge a ~~pipe~~ gate sluice 4' high by 4' wide ~~inches inside diameter~~ and the bottom will be 16' feet below the spillcrest, a sluice ~~single~~ 4' feet wide in the clear by 4' feet high, and the bottom will be 4 feet below the spillcrest.

19. Apron. Below the proposed dam there will be an apron built of no apron, solid rock foundat[ion] feet long across the stream, ... feet wide and .... feet thick. The downstream side of the apron will have a thickness of .... feet for a width of .... feet. bucket on down-stream face of proposed O-G type spillway

20. Plans. Each application for a permit of a dam over 12 feet in height must be accompanied by a location map and complete working drawings in triplicate of the proposed structure, one set of which will be returned if they are approved. Each drawing should have a title giving the parts shown, the name of the town and county in which the dam site is located, and the name of the owner and of the engineer.

The location map (U. S. Geological Quadrangle or other map) should show the exact location of the proposed dam; of buildings below the dam which might be damaged by any failure of the dam; of roads adjacent to or crossing the stream below the dam, giving the lowest elevation of the roadway above the stream bed and giving the shape,

the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the dam.

The complete working drawings should give all the dimensions necessary for the calculations of the stability of the structure, and all the information asked for below under "Sketches." There may be attached to the application any written reports, calculations, investigations or opinions that may aid in showing the data and method used by the designer. State the assumed ice and uplift pressures and the conditions on which based.

21. **Sketches.** For small and unimportant structures, if plans have not been made, on the back of this application make a sketch to scale for each different cross-section at the highest point; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spill at 18 inches below the crest), the elevation of the top in reference to the spillcrest, the length of the section, and the material of which the section is to be constructed; on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillcrest; and outline the apron. Also sketch an elevation of each end of the dam with a cross section of the banks, giving the depth and width excavated into the banks.

22. **Elevations.** Also give the elevations, if possible from the Mean Sea Level, of at least two permanent Bench Marks; of the spillcrest for any existing dam on the proposed dam site, at the middle and at the ends of the spill; of the spillcrest for the above proposed dam; and of the spillcrest of any adjacent dams.

23. **Samples.** When so instructed, send samples of the materials to be used in the construction of the proposed dam, using shipping tags which will be furnished. For sand, one-half a cubic foot is desired (exclusive of any stone over $\frac{3}{4}$ inch in size mixed therewith); for cement, three pints; and for the natural bed, twenty cubic inches if of ledge and one-half a cubic foot if of soil.

24. **Inspection.** State how inspection is to be provided for during construction close inspection dur construction by our engineers. State inspection at option of the State

25. **Water Supply.** Are the waters impounded by the above dam to be used for a public water supply? no
Has an application under the provisions of Article IX of the Conservation Law for such use been made to the Water Control Commission, Albany, N. Y.?

** Junction with Curved Dam will be on State Canal land, during construction, and when completed, will be deeded to the State.

<u>General</u>. The proposed spillway will join the west end of the State's Curved Dam, extend down stream, parallel to the flow of the stream, a total of 284 feet and there join a Regulating Gate structure, 182 feet long, said Regulating Gates extending to the west bank of the present Varick Canal, full ~~details~~ being shown on the above mentioned plans ~~which plans are hereby~~ made a part of this application.

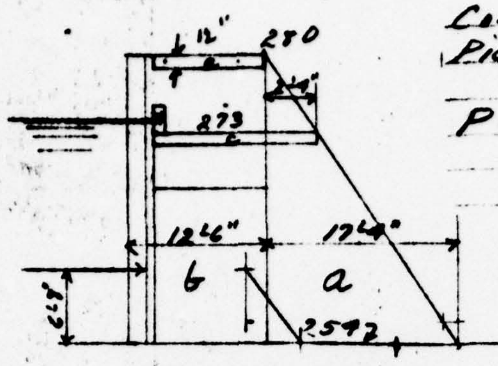
The above information is correct to the best of my knowledge and belief.

Oswego, New York.
(Address of signer)

The General Development Corp

Oct. 20. 1925
(Date)

Ernest E Whitney. Vice. Presid
(A person signing for owner should indicate his title or authority)



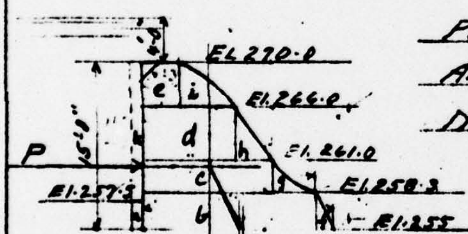
Concrete 140 Lbs per Cu.Ft.

Piers 2'-6" Wide, 14'-0" c-c, 11'-6" Clear

$P = 62.5 \times \frac{20^2}{2} \times 14.0 = 175000$

Sect.	Volume	Cu.Ft.	Weight	Arm	Moment	
a	$\frac{17.33}{2} \times 26.0 \times 2.5$	562	78800	18.50	1440000	
b	12.5 × 26.0 × 2.5	813	114000	6.25	712000	
c	12.33 × 10 × 11.5	142	19900	8.67	173000	
d	1.0 × 2.5 × 11.5	29	4060	3.00	12000	Coef. of Sliding
e	10.0 × 1.0 × 11.5	115	16100	7.50	121000	$\frac{175000}{232860} = 0.752$
P	175000#			6.67	1168000	
			232860		3626000	

Pos. of Res = 3626000 ÷ 232860 = 15.6'



Pos. of Res. Water Pres = $\frac{15+12}{15+8} \times \frac{15}{3} = 5.87$

Amt of Water Pres $\frac{4+19}{2} \times 62.5 \times 15 =$ 10800 Lbs (P)

Neglect Vert. Press. (k) and chamfer on (a)

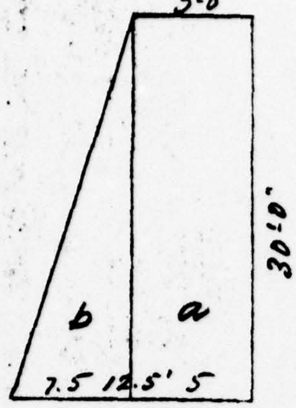
Upward Pres $\frac{1}{4}$ h at toe, 0 at heel.

$19 \times 62.5 \times \frac{1}{4} \times \frac{18.0}{2} = 2670$

Sect.	Area		Weight	Arm	Moment	
a	1.0 × 2.5	2.5	350	0.5'	175	
b	15.5 × 3.3	51.1	7150	8.75	62525	
c	11.75 × 2.7	31.7	4440	6.88	30600	Coef. of Sliding (No Uplift)
d	8.33 × 5.0	41.7	5840	5.17	30200	10800 ÷ 23150 = 0.47
e	3.25 × 4.0	13.0	1820	2.62	4800	Coef. of Sliding (With Uplift)
f	$\frac{1.6}{2} \times 3.3$	2.6	360	17.03	6100	10800 ÷ 20480 = 0.53
g	$\frac{3.75}{2} \times 2.7$	5.1	710	14.00	9900	
h	$\frac{3.42}{2} \times 5.0$	8.5	1190	10.47	12400	
i	$\frac{4.58}{2} \times 4.0$	9.2	1290	5.75	7400	
			23150		169100	$\frac{169100}{23150} = 7.34$ Toe to C.G.
P		10800#		5.87	63400	
			23150		227500	$\frac{227500}{23150} = 9.83$
U			-2670	6.00	-16000	
			20480		211500	$\frac{211500}{20480} = 10.32$

H.E. Brainard
Sept. 16-1925

13 Osage



$P = 50 \times (.535 \times 30)^2 = 12900$

Section	Area	Weight	Arm	Moment
a	150	21200	2.5	53000
b.	112.5	15800	7.5	118500
P	(12900)		10	129000
		37000		300500

$\frac{300500}{37000} = 8.12$ heel to resultant. 8.33 to Middle Th.

Hor. Is on gate

Pres per lin. ft. = 19 x 62.5 x 1.5 = 1780 Lbs

M = 1780 · 6.0² x 1.5 = 196000 9.25

5" I 10# Sec Mod = 4.8, 96000 ÷ 4.8 = 20,000

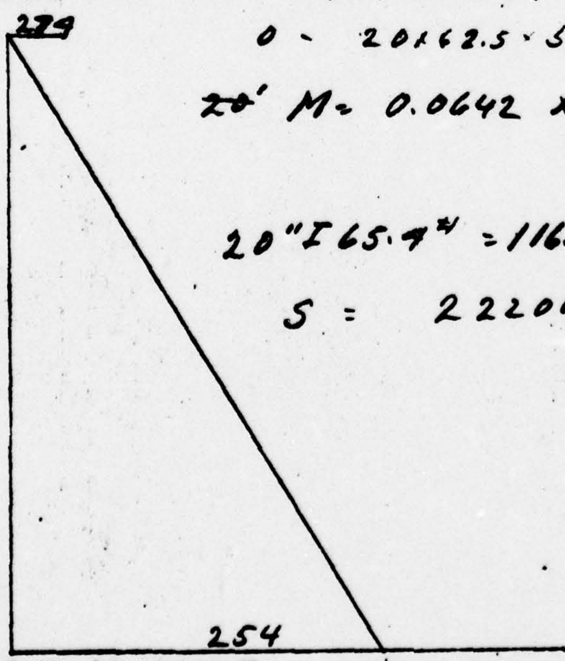
0 = 20 x 62.5 x 5 ...

20' M = 0.0642 x 7200 x 20² = 185000' Lbs

= 2,220,000" Lbs

20" I 65.4# = 116.9

S = 2220000 ÷ 116.9 = 19000



H.E.B 10-21-25

B.12

13 Pgs

(6)

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS 0007 701 3A	O	1166+00	270.0	12.0		35	CURVED DAM AT LOCK 07 - OSWEGO
WS X001 701 3A	X						CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
WS Y002 701 3A	Y	5090+00	375.4			5	OWASCO CREEK ENTRANCE 550FT LEFT
WS 0023 701 3C	E		369.9	8.0		M93	CAUGHDENOY DAM
WS 0124 701 3D	E	3931+50			1	635	TAINTOR GATE CONT M63-5
WS F002 701 3D	F				1		WASTE GATE - BUTTERNUT AQUEDUCT
WS F081 701 3D	F				2		BUTTERNUT FEEDER BULKHEAD
WS F0D4 701 3D	F				4		DERUYTER INLET HEADGATES
WS F0D3 701 3D	F			5.0			STREAM ENT. - DERUYTER INLET
WS F0D1 701 3D	F		1280.0	3.0			DERUYTER DAM SPILLWAY
WS F0D2 701 3D	F				3		DERUYTER DAM OUTLET GATES
WS F0F1 701 3D	F				4		LIMESTONE FEEDER BULKHEAD
WS F001 701 3D	F				1		WASTE GATE - LIMESTONE AQUEDUCT
WS F0J1 701 3D	F						JAMESVILLE DAM SPILLWAY
WS F0J2 701 3D	F				3		JAMESVILLE DAM OUTLET GATES
WS 0031 701 3D	O		363.0	12.0	6	80	TAINTOR GATES Key E, Movable Crest
WS 0021 701 3D	O		363.0			80	NORTH AUTO FLASHBOARD BLOCKED TOP Key D
WS 0051 701 3D	O		363.0			80	SOUTH AUTO FLASHBOARD BLOCKED TOP Key F
WS 0011 701 3D	O		363.0	11.0		80	NORTH SPILLWAY Key D
WS 0041 701 3D	O		363.0	11.0		80	SOUTH SPILLWAY Key F
WS 0012 701 3D	O		352.8	10.3		10A	SPILLWAYS Key H
WS 0022 701 3D	O				6	10A	TAINTOR GATES Key I
WS 0001 701 3D	O	661+00	311.0			205	SPILLWAY IN DIKE BELOW LOCK 03
WS 0005 701 3D	O	1180+75				35	BY-PASS CULVERT ABOVE LK 07 2 GATES
WS 0007 701 3D	O	1184+80			1	709	FEED GATE - LOCK 07

B-

SLUICE GATES, SPILLWAYS, WASTE WEIRS - 1977

3D-5 2a

	STRUCTURE ID NO			CONCRETE						SUPER STRUCTURE			MACHINERY			SL GATES					GATES FLSHBRDS		STPLGS		ELECT				
	SCTN	HSTRC NO	TYPE	ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNSTRM APRON	SPLWY SRFCE	SPHN INTRIOR	OPRTNG TRSTLE	CATWALKS	RAILINGS	STEM. GEARING	FLR STD ETC	SPHN VLVL LNR	GATE FRAME	GATE SKN PLATE	GATE SEALS	SEATS	GUIDES	BOARDS	ANCHORS	STOPLOGS	GUIDES	MOTORS	WIRING	TRASH RACKS	GEN RECOMMEND	
	5	0124	3D	7	7	X	X	7	N	7	7	7	7	N	N	7	7	7	7	7	N	N	N	N	7	7	N	7	N. cable frayed
	5	F002	3D	7	N	N	N	N	N	N	N	N	N	N	N	7	7	7	6	7	N	N	N	7	N	N	N	7	
	5	F011	3D	7	7	X	X	X	N	N	N	N	N	N	N	X	X	X	X	7	N	N	N	7	N	N	N	7	
#35	5	F014	3D	7	7	X	7	N	N	7	7	7	7	7	N	7	7	7	7	7	7	7	N	N	N	N	7	7	clear brush out of walls, clean silt + debris above
#36	5	F003	3D	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	some stones moved
#37	5	F001	3D	7	N	7	7	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	broken floor stand
#38	5	F002	3D	N	N	N	N	N	N	7	N	N	5	1	N	X	X	7	7	X	N	N	N	N	N	N	N	3	
	5	F0P1	3D	7	5	X	7	N	N	N	7	7	N	N	N	N	N	N	N	N	N	N	7	7	N	N	N	7	
	5	F001	3D	7	N	N	N	N	N	N	N	N	N	N	N	N	5	5	5	5	N	N	N	N	N	N	N	5	
	5	F0J1	3D	7	N	X	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Abutment needs pointing
	5	F0J2	3D	N	N	N	N	N	N	3	N	N	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3	
#2	5	0031	3D	1	1	N	X	N	N	N	3	3	5	5	N	1	1	1	X	N	N	N	N	N	N	N	N	1	main anch. poor, elect. poor, finish paint, all conc. poor
#3	5	0021	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#4	5	0051	3D	5	N	N	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#5	5	0011	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#6	5	0041	3D	5	N	N	X	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#15	5	0012	3D	3	1	N	5	1	N	N	N	N	N	N	N	N	N	N	N	N	7	3	N	N	N	N	N	3	6" +/- of surface worn away, corner pier - v. poor, hole in spill crest
#16	5	0022	3D	7	7	X	7	N	N	N	7	7	7	7	N	5	5	3	7	N	N	N	N	N	N	N	N	3	align. racks + pinion, paint, leakage thru abut wall
	5	0001	3D	3	N	N	X	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	
#29	5	0005	3D	7	7	N	X	X	N	6	N	N	7	7	N	7	7	7	7	7	N	N	N	N	N	N	N	5	
#30	5	0007	3D	7	N	X	N	N	N	7	N	N	7	Z	N	7	7	[illegible]	7	7	N	N	N	N	7	7	X	7	
	5	0002	3D	[illegible]	N	N	N	7	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	paint frame holding grating
	5	0003	3D	7	N	N	N	7	N	N	7	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	Y001	3D	5	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	

(3)

[redacted]

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS 0002 701 3D	O	1191+00	255.8			W64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003 701 3D	O	1203+71	255.8			W64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS Y001 701 3D	Y	60+15				720	ONONDAGA CREEK SPILLWAY
WS 0224 701 3E	E	3931+90				208	TAINTOR GATE NW POWER RACE 530 FT L
WS F001 701 3E	F						OVERFLOW FLUME -DERUYTER DAM
WS F002 701 3E	F						DERUYTER OUTLET FLUME
WS 0051 701 3E	O	118+80			3	80	SOUTH HEADGATE NO 1 PLUGGED Key G
WS 0061 701 3E	O	119+10			4	80	SOUTH HEADGATE NO 2 PLUGGED " "
WS 0071 701 3E	O	119+40			3	80	SOUTH HEADGATE NO 3 PLUGGED " "
WS 0011 701 3E	O	121+80	352.0	13.3	8	80	NORTH HEADGATE NO 1 Raceway SILL
WS 0021 701 3E	O	121+56			3	80	NORTH HEADGATE NO 2 PLUGGED Key C
WS 0031 701 3E	O	121+42			3	80	NORTH HEADGATE NO 3 PLUGGED " "
WS 0041 701 3E	O	121+28			3	80	NORTH HEADGATE NO 4 PLUGGED " "
WS 0053 701 3E	O	640+00				108	POWER FOREBAY - LOCK 03 - FULTON Key D
WS 0043 701 3E	O	640+35			2	108	BULKHEAD NO 4 W SIDE LOWER DAM Key M
WS 0033 701 3E	O	640+50			10	108	BULKHEAD NO 3 W SIDE LOWER DAM " "
WS 0023 701 3E	O	642+20			3	108	BULKHEAD NO 2 E SIDE LOWER DAM Key H
WS 0063 701 3E	O	652+00				10	POWER TAILRACE BELOW LOCK 03 Key P
WS 0005 701 3E	O	972+15				37	BULKHEAD NO 5 - MINETTO
WS 0052 701 3E	O				17	10	BULKHEAD NO 5 (UPPER DAM) Key G
WS 0006 701 3E	O	1145+90			24	37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
WS 0077 701 3E	O	1169+06			24		BULKHEAD NO7 - CURVED DAM - OSWEGO
WS 0017 701 3E	O	1185+00				35	HYDRAULIC CANAL BULKHEAD (SEALED)
WS 0001 701 4A	E		369.9			728	CLEVELAND TERMINAL
WS 0002 701 4A	E						DOCK-FRENCHMANS IS

3E-546 (3a)

SLUICE GATES SPILLWAYS WASTE WEIRS - 1977

	STRUCTURE ID NO			CONCRETE						SUPER STRUCTURE			MACHINERY			SL GATES					GATES FLSHBRDS		STPLGS		ELECT		TRACKS RACKS	GEN RECOMMEND
	SCTN	HSTRC	TYPE	ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNSTRM APRN	SPLLWY SRFCE	SPHN INTRIOR	OPRTNG TRSTLE	CATWALKS	RAILINGS	STEM GEARING	FLR STD ETC	SPHN VLV LNR	GATE FRAME	GTES SKN PLATE	GATE SEALS	SEATS	GUIDES	BOARDS	ANCHORAGE	STOPLOGS	GUIDES	MOTORS	WIRINGS	TRACKS RACKS	RECOMMEND
	5	0224	3E	5	N	X	X	X	N	7	7	7	7	7	N	6	6	X	X	N	3	3	N	N	N	N	N	5
[illegible]	5	F0D1	3E	N	N	N	N	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
[illegible]	5	F0D2	3E	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#7	5	0051	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#8	5	0061	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#9	5	0071	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#10	5	0011	3E	5	5	X	X	N	N	7	5	3	7	3	N	3	3	3	3	3	N	N	N	N	N	N	N	3
#11	5	0021	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#12	5	0031	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#13	5	0041	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#19	5	0053	3E	6	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#20	5	0043	3E	7	5	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	5
#21	5	0033	3E	7	5	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	5
#22	5	0023	3E	3	3	X	X	N	N	N	N	1	3	3	N	X	X	X	X	X	N	N	N	N	X	3	3	5
#23	5	0063	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
#25	5	0005	3E	5	3	N	N	N	N	7	3	7	3	N	N	3	1	3	N	N	N	N	N	N	N	N	N	3
[illegible]	5	0052	3E	7	5	X	X	N	N	N	7	N	3	3	N	3	X	X	X	X	N	N	N	N	N	N	N	5
#27	5	0006	3E	3	5	N	N	N	N	7	7	N	N	3	N	5	4	X	X	5	N	N	N	N	N	N	N	5
#31	5	0077	3E	7	7	X	X	N	N	5	N	7	N	3	N	5	5	X	X	5	N	N	N	N	3	N	N	5
#32	5	0017	3E	5	5	X	X	N	N	N	N	N	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	7
	6	S002	3E	5	5	N	X	N	N	N	N	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	7
	6	S001	3E	7	7	N	X	N	N	N	7	N	7	7	N	6	6	6	6	N	N	N	N	N	N	N	N	7
	6	Y001	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7

Blk [illegible] dump fill + debris, breach [illegible] to canal [illegible]

M... 1979

REG. 3. REGION #3
DEPT. OF TRANSP.

MAY 29 '79

RTE.	INIT
REGIONAL DIRECTOR	
ADMINISTRATION	
CONSTRUCTION	
DESIGN	
COUNSEL	
MAINTENANCE	
PERSONNEL	
PLANNING	
REAL ESTATE	
TRAFFIC ENGR.	
WATERWAY	

ORIGINAL SIGNED BY
THOMAS L. WONSCHEL

May 24, 1979

P.I.N. ML7000.701.11, MANAGEMENT BY OBJECTIVES
INSPECTION OF WATER IMPOUNDMENT STRUCTURES IN REGION 3

J. J. Murphy, Materials Bureau, Rm. 210, Bldg. 7A

J. R. Stellato, Waterways Maint. Subdiv., Rm. 216, Bldg. 5

cc L. E. Burns, Waterways Maintenance Engineer, Region 3
L. H. Moore, Soil Mechanics Bureau, Rm. 102, Bldg. 7

In the Fall of 1978 and the Spring of 1979, the seven "Priority 3" structures (as outlined in your letter of January 31, 1978) were inspected by Mr. Sam Candib. There are no "Priority 4" structures, but three non-priority structures will be inspected. The "Priority 3" structures are:

Oswego Curved Dam (Lock O-7)
Butternut Creek Feeder Dam (DeWitt)
DeRuyter Reservoir Inlet Feeder Dam
Lock 30E Bypass Retention Dam (Macedon)
Canandaigua Outlet Retention Dam (Lock 27E, Lyons)
Owasco Creek Retention Dam (~~Howland Island~~)
Military Run Culvert (Newark)

ok?

The only large structure is the Oswego Curved Dam on the Oswego River, just south of Lock O-7. It is the first dam upstream from Lake Ontario. All the other structures, except Military Run Culvert, are small dams which impound little water.

Problems were found associated with the Oswego Curved Dam, Butternut Creek Feeder Dam and the Military Run Culvert.

Oswego Curved Dam (Lock O-7)

This spillway dam is approximately 14 feet high, over 750 feet long and consists of two sections. The 517 foot long, curved main section was built with stone block masonry and the 250 foot long, west end side spillway section was constructed with portland cement concrete.

The main curved section was originally completed in 1857 as a replacement for a wooden dam needed for the Oswego Canal and the Varick Canal. The privately owned Varick Canal consisted of a bulkhead and guard lock at the west end of the dam and a 3,000 foot long walled channel serving mills along the river.

In 1894, the timber apron in front of the dam was replaced with a stone block masonry one. The apron was bolted to bedrock and prevented the wearing away of the soft bedrock.

In 1896, the dam was raised so that the depth of the Oswego Canal could be increased from 7 feet to 9 feet. We assume the dam was raised by the addition of stone block masonry, as opposed to flashboards.

In 1908 when the Barge Canal was built, Contract 35 called for the dam to be raised again about 2¼ feet by the addition of coping stones. The coping stones or stone blocks were to have sockets so that flashboards could be added. The Varick Canal guard lock and bulkhead were also supposed to be raised at this time. However, none of this work was done under Contract 35 as the raising of the water level would have affected Contract 37 construction of Lock 0-6 immediately upstream. By Alteration #11, the work was transferred from Contract 35 to Contract 37 and in 1912, the work was completed under Alteration #7 of Contract 37.

Since then, there has been no known further work done by contract or by State Maintenance Forces, but the top 2 feet of the main dam is composed of concrete instead of stone masonry. One possible explanation is that concrete substituted for stone masonry under Alteration #7, Contract 37. The final books would have to be checked to determine whether this is correct.

Also, no plans were found for the construction of the concrete side spillway and the bulkhead across the power raceway which feeds a Niagara Mohawk Power Station about 1,000 feet north of the bulkhead. On page 4 of the 1925 Superintendent of Public Works Report, a paragraph was found which mentioned an agreement between the State and the General Development Corporation of Oswego for enlargement of the curve dam spillway. The permit for this work eliminated the Varick Canal and converted it into a power raceway.

With this information, the Region contacted the Niagara Mohawk Power Corporation and obtained a copy of the permit (#428) and the plans for the work. A file card for the permit, but not the permit, was later located in your office, but the number had been changed from #428 to #359. The file card noted that more information is contained in a special folder of Contract 35.

The plans seem to agree with the existing structure, except that there are three sluice gates located at the west end of the bulkhead instead of the two shown on the plans. The plans, permit and transmittal letter sent to Mr. Candib are attached. As mentioned in the transmittal letter, it is not known if the land and structures were ever deeded to the State, but the permit says that the structures now belong to the State.

It was fortunate at the time of inspection that all of the Oswego River was flowing through the powerhouse and none was going over the dam's flashboards. One could easily walk all along the bottom front of the dam.

The front face of the main curved dam is an 8 foot high nearly vertical wall with 1½ foot high flashboards on top. In front of this wall is a gently sloping 20 foot long apron which is about 3-4 feet high at the downstream end. The whole dam rests on bedrock. The stone masonry blocks of the apron are pinned together near the toe with U shaped iron bars that extend down into bedrock. The bars looked identical to those used to hold the stone masonry Erie Canal lock walls vertical.

Nearly all the stone masonry joint areas looked in good condition with most of the joint mortar intact. However, there were at least 6 places where small streams of water were squirting out from the joints and a few others where water was running down the face of the dam. None of these small leaks presently appeared large enough to require immediate plugging.

In the riverbed downstream from the stone masonry apron, there was an uneven 1-3 foot deep pool in bedrock. Near the middle of the main curved dam, two boils, about 30 feet apart, were seen rising in the pool about 3 feet from the apron toe. A rough estimate of the flow would be that capable of passing through a 6 inch diameter pipe under the dam at one boil and a 4 inch diameter pipe at the other. Since the dam is on bedrock and the river runs through a gorge to Lake Ontario just over 1 mile downstream, this problem is not serious, but the leaks should be plugged.

At the east end of the bulkhead on the upstream side of the raceway, there are three sluice gates through the dam wall at three different levels. The two upper gates appear to have been disconnected and no longer open. The lowest gate would normally open, but the steel rails which are attached to the sliding door are nearly rusted through at the waterline and would snap if an attempt to open is made. This sluice gate also leaks considerably.

The west side of the raceway appeared to be lined with a concrete wall attached to bedrock. About 30 feet upstream from the bulkhead, the beginning corner of this wall has been undermined for at least 6 feet by the collapse of the underlying bedrock. If this corner fails, it will take out a section of chain link fence and lawn.

Butternut Creek Feeder Dam
When constructed, around 1875 water passed over this 70-80 foot long, stone masonry dam and probably dropped some 4-5 feet. Due to sediment deposits, tree growth and trapped debris, the channel downstream of the dam has filled to the point where the water drop today is only 4-5 inches.

Immediately downstream from the west abutment, the embankment between the feeder channel and Butternut Creek is now too low. During high water, the Creek overflows this embankment and feeds directly into the feeder channel. Some gravel has been dumped into the area in an attempt to raise the embankment, but more is needed.

Military Run Culvert (Newark)
Military Run passed under the original Erie Canal through an approximately 8 foot wide by 4 foot high, stone block, arch culvert. The Barge Canal location coincided with the Enlarged Erie, but at a much lower depth which required removal of half or more of the downstream section. The upstream or south section was supposed to be removed by Contract 76, but for some unknown reason it was retained. This section exits from the south bank of the Barge Canal about 1 foot above normal water elevation.

Since then, the land adjacent to the old culvert and all along the south canal bank in this area of Newark has been filled in for business development along nearby Route 31. No fill was deposited over the culvert as this was State land. This created a 20-25 foot wide by 50-60 foot long tree covered area about 6 feet lower than the adjacent land. Fences were erected along the edge of the adjacent land to keep people from falling in and the land paved.

Sometime possibly within the last 20 years, an 8 foot round section near the center of the culvert totally collapsed. Two large trees growing on the edge of the collapsed section appear to have caused the failure. However, the extent of root development down into the collapsed area indicated that the trees were very small when the collapse occurred. Thus the roots probably had little to do with the collapse.

After the collapse, soil began washing into the hole and an edge of the parking area was undermined. One of the fence posts and its in-ground concrete support is now suspended in air. Boards and rocks have been thrown into the hole by the fence so no one will fall into it.

Between Route 31 and the culvert entrance, the stream channel is walled. Soil under the parking area has apparently been washing into the stream and the blacktop has settled. Part of a telephone pole has been laid in front of the area to keep cars out. It is not known if the wall area in front of the culvert is the State's responsibility.

Conclusion

The problems noted at these structures should be investigated further and appropriate action taken. At the Oswego Dam, the most immediate problem should be the stabilization of the undermined west wall corner just up from the bulkhead. The leaks through and under the dam have undoubtedly been there for years, but they should be plugged. The sluice gates are not really needed anymore and the lower one could probably also be sealed.

At Butternut Creek, the embankment should be raised to avoid an embankment failure further downstream.

At Military Dam, the easiest solution would probably be to remove the existing stone block arch culvert and replace it with a new corrugated metal pipe.

A more detailed report with pictures of each structure will be forwarded at a later date.

In cooperation with the Region, the Niagara Mohawk Power Corporation and nature, attempts will be made to divert all river water through power houses at other Oswego River Dams. Then, a thorough inspection of the dam face and toe areas will be made.

JJM:SJC:FS
File: 17.1-2-2

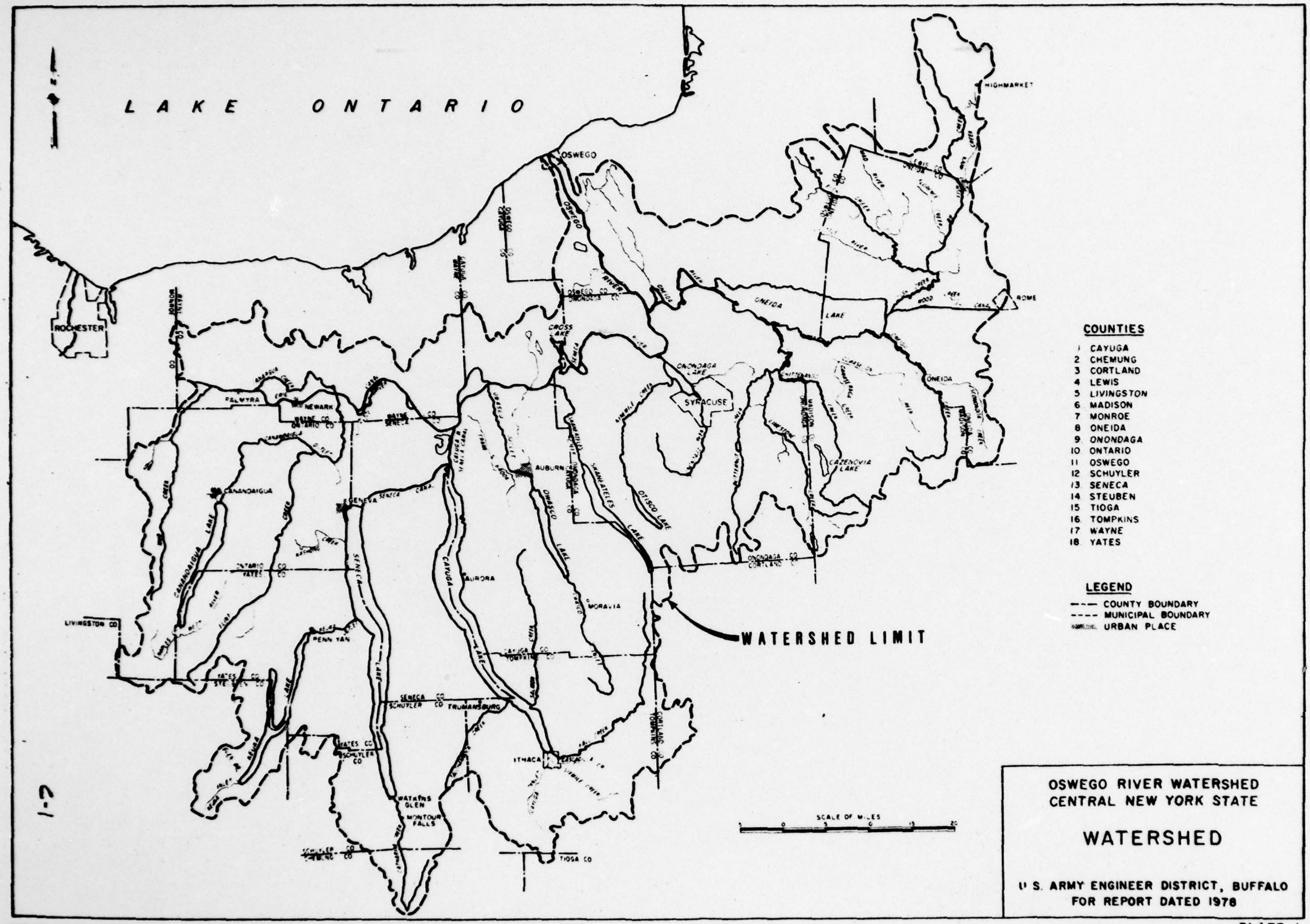
Attachment

APPENDIX C

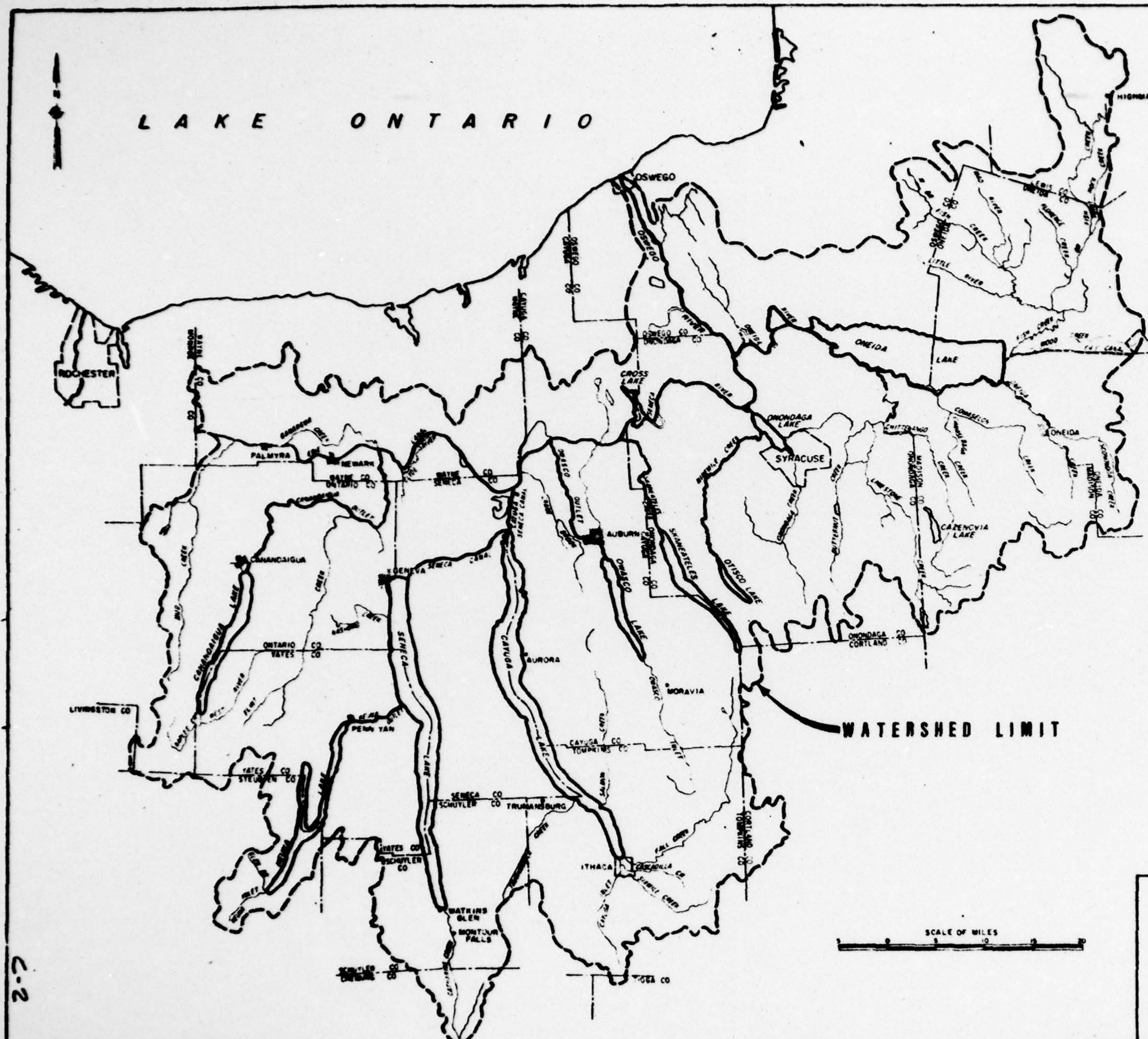
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY

Figure C-1	Watershed - Oswego River Basin
Figure C-2	Principal Drainage System
Figure C-3	Facilities (Water Management)
Figure C-4	Storm Pattern June 20-25, 1972
Figure C-5	HEC-1 Derived Discharge-Frequency Curve By N.Y.S.D.E.C.
Figure C-6	Basin Model (HEC-1) Sub-Basins and Sub-Areas
Figure C-7	Basin Model (HEC-1) Flood Routing System
Figure C-8	Calibrated HEC-1 Results (June 20-25, 1972)
Table I-1	Physical Characteristics of Lakes in the Basin


LAKE ONTARIO
OSWEGO
ROCHESTER
HIGHMARKET
ROME
ONEIDA LAKE
ONONDAGA LAKE
SYRACUSE
CROSS LAKE
OTISCO LAKE
SKANEATELES LAKE
OWASCO LAKE
CAYUGA LAKE
SENECA LAKE
CANANDAIGUA LAKE
CAZENOVIA LAKE
AUBURN
GENEVA
CANANDAIGUA
PALMYRA
NEWARK
AURORA
MORAVIA
PENN YAN
TRUMANSBURG
ITHACA
WATKINS GLEN
MONTOUR FALLS
LIVINGSTON CO
TIOGA CO
WATERSHED LIMIT
COUNTIES
1 CAYUGA
2 CHEMUNG
3 CORTLAND
4 LEWIS
5 LIVINGSTON
6 MADISON
7 MONROE
8 ONEIDA
9 ONONDAGA
10 ONTARIO
11 OSWEGO
12 SCHUYLER
13 SENECA
14 STEUBEN
15 TIOGA
16 TOMPKINS
17 WAYNE
18 YATES
LEGEND
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
URBAN PLACE
SCALE OF MILES
5 0 5 10 15 20
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
WATERSHED
U S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

C-1



PRINCIPAL DRAINAGE SYSTEM

RESERVOIRS: CANANDAIGUA, KEUKA, SENECA, CAYUGA, OWASCO, SKANEATELES, OTISCO (FINGER LAKES RESERVOIRS); CROSS, ONONDAGA, ONEIDA

CHANNELS: CANANDAIGUA OUTLET, CLYDE RIVER, KEUKA OUTLET, SENECA RIVER & ASSOC. CANALS, OWASCO OUTLET, SKANEATELES CREEK, NINEMILE CREEK, ONONDAGA OUTLET, ONEIDA RIVER & ASSOC. CANAL, OSWEGO RIVER

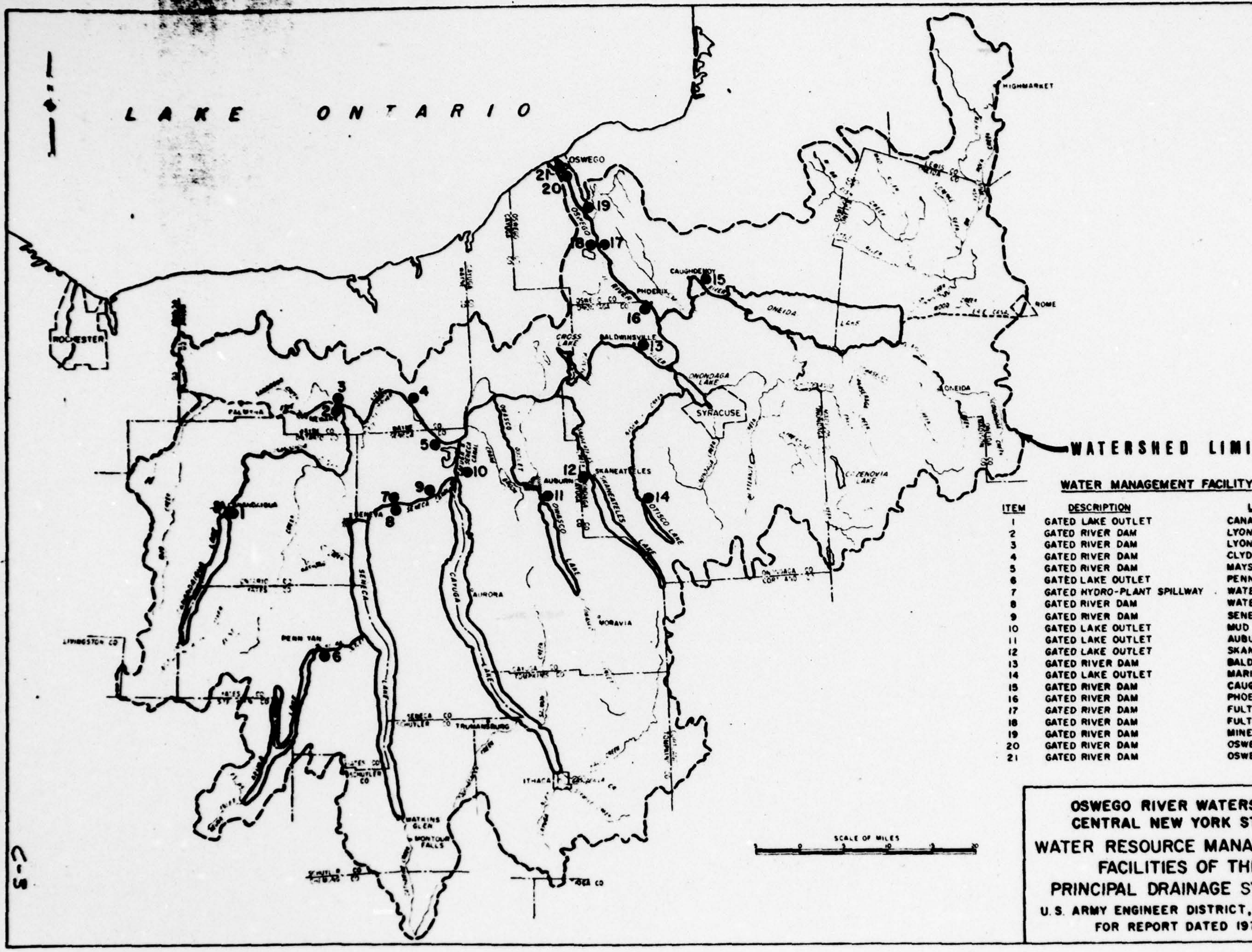
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

PRINCIPAL
DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

C-2

PLATE



WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CANANDAIGUA
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	MAYS-POINT
6	GATED LAKE OUTLET	PENN YAN
7	GATED HYDRO-PLANT SPILLWAY	WATERLOO
8	GATED RIVER DAM	WATERLOO
9	GATED RIVER DAM	SENECA FALLS
10	GATED LAKE OUTLET	MUD LOCK
11	GATED LAKE OUTLET	AUBURN
12	GATED LAKE OUTLET	SKANEATELES
13	GATED RIVER DAM	BALDWINSVILLE
14	GATED LAKE OUTLET	MARIETTA
15	GATED RIVER DAM	CAUGHDENOY
16	GATED RIVER DAM	PHOENIX
17	GATED RIVER DAM	FULTON
18	GATED RIVER DAM	FULTON
19	GATED RIVER DAM	MINETTO
20	GATED RIVER DAM	OSWEGO
21	GATED RIVER DAM	OSWEGO

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

WATER RESOURCE MANAGEMENT
FACILITIES OF THE
PRINCIPAL DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE

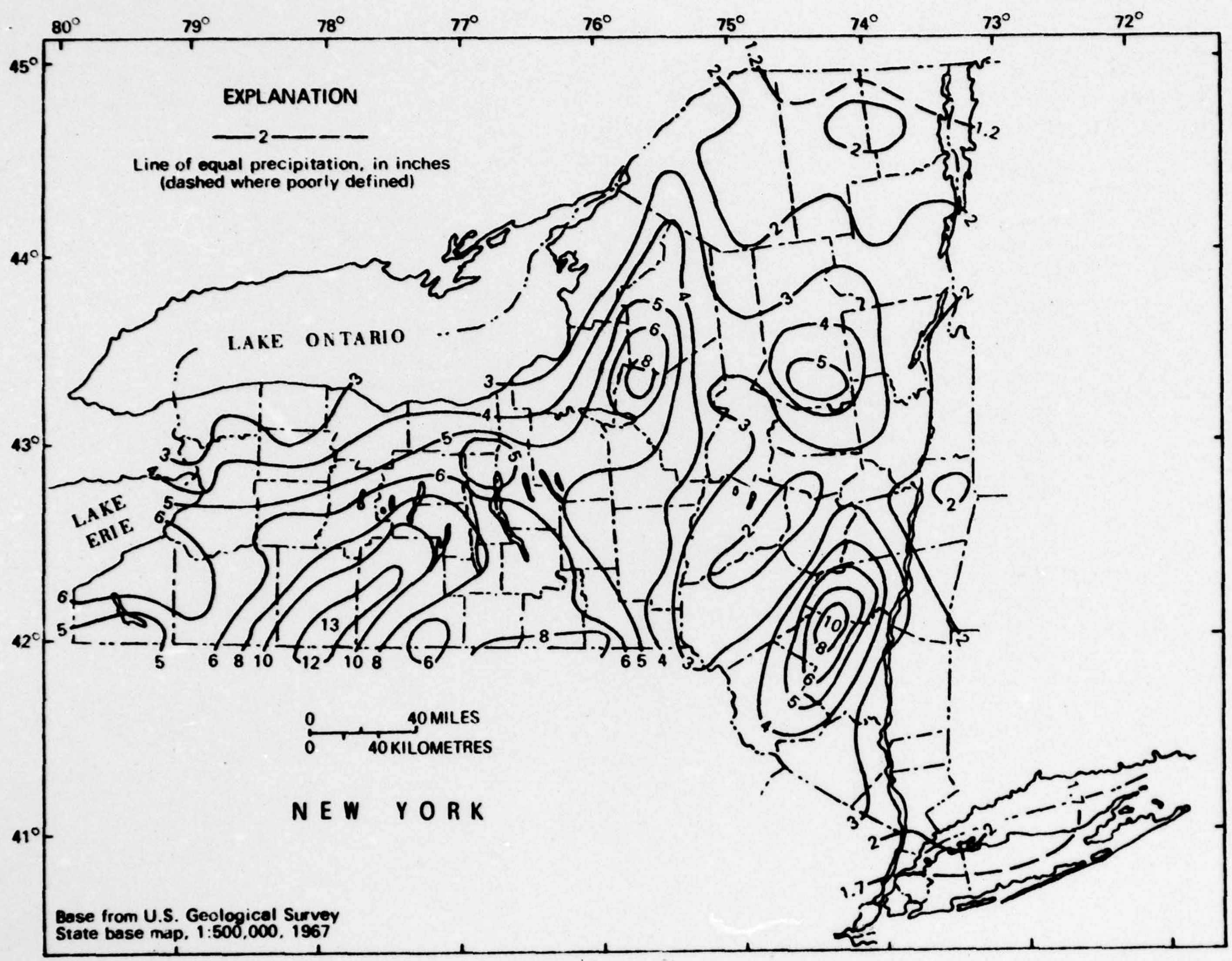
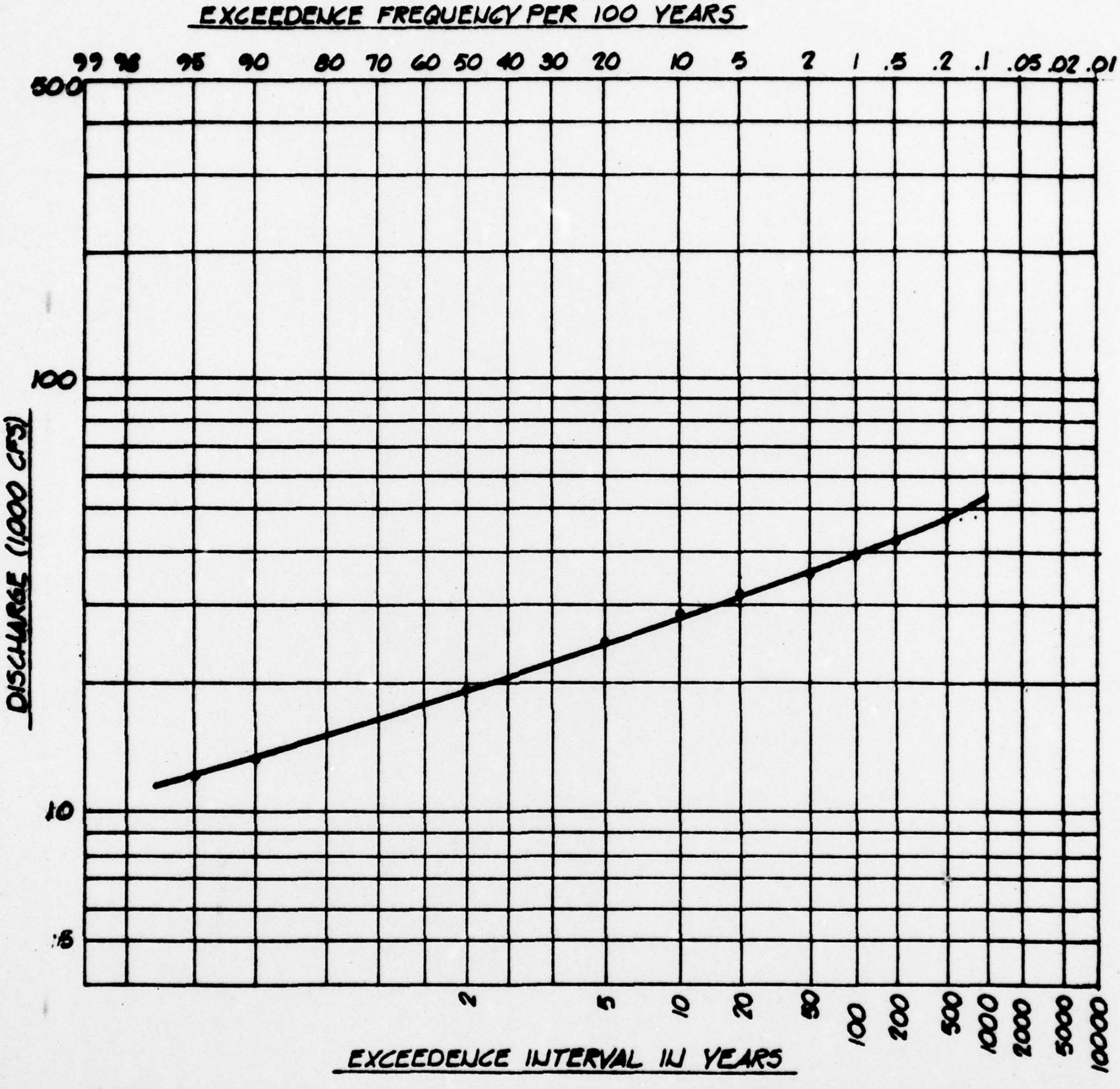


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

C-4

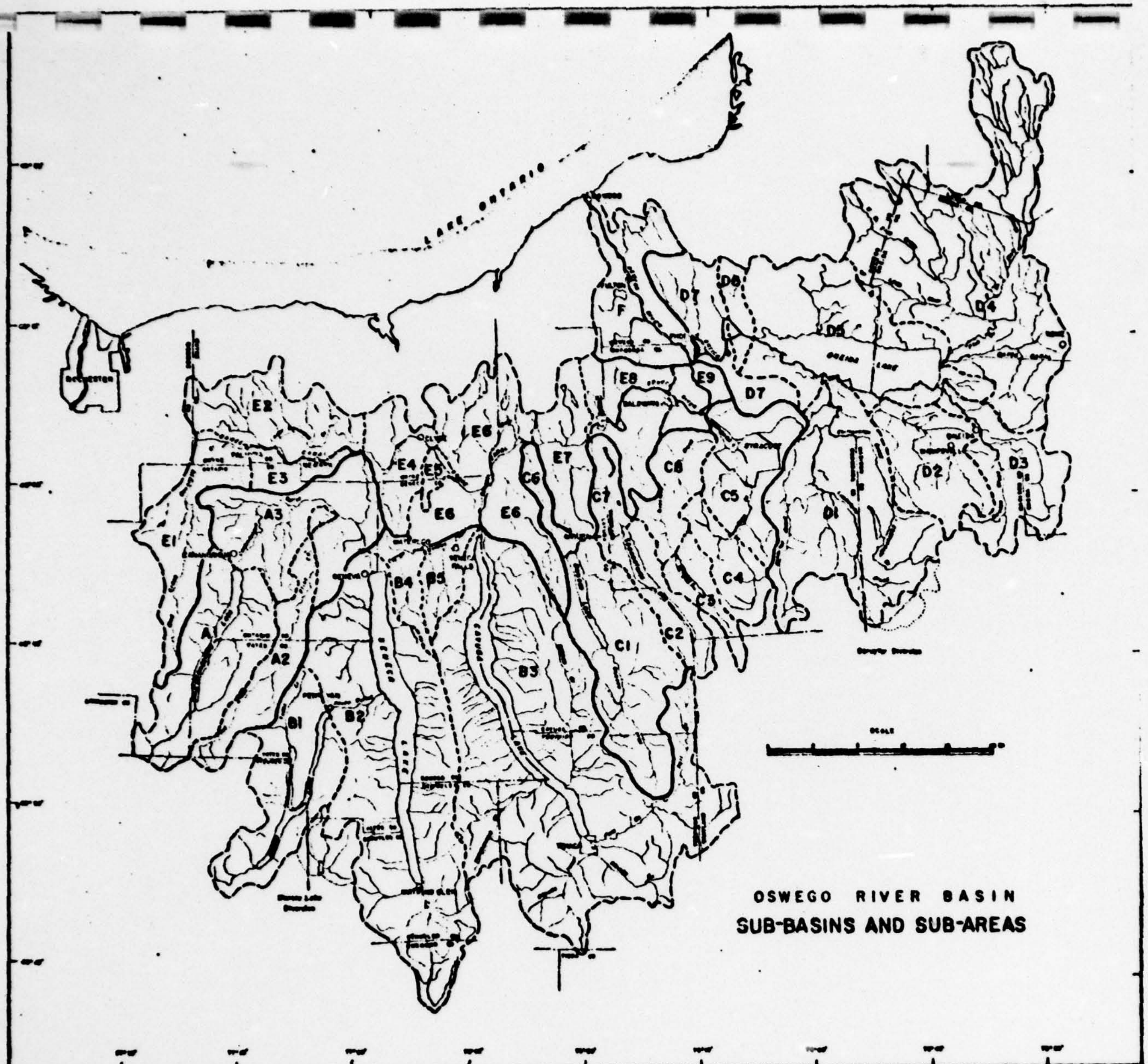


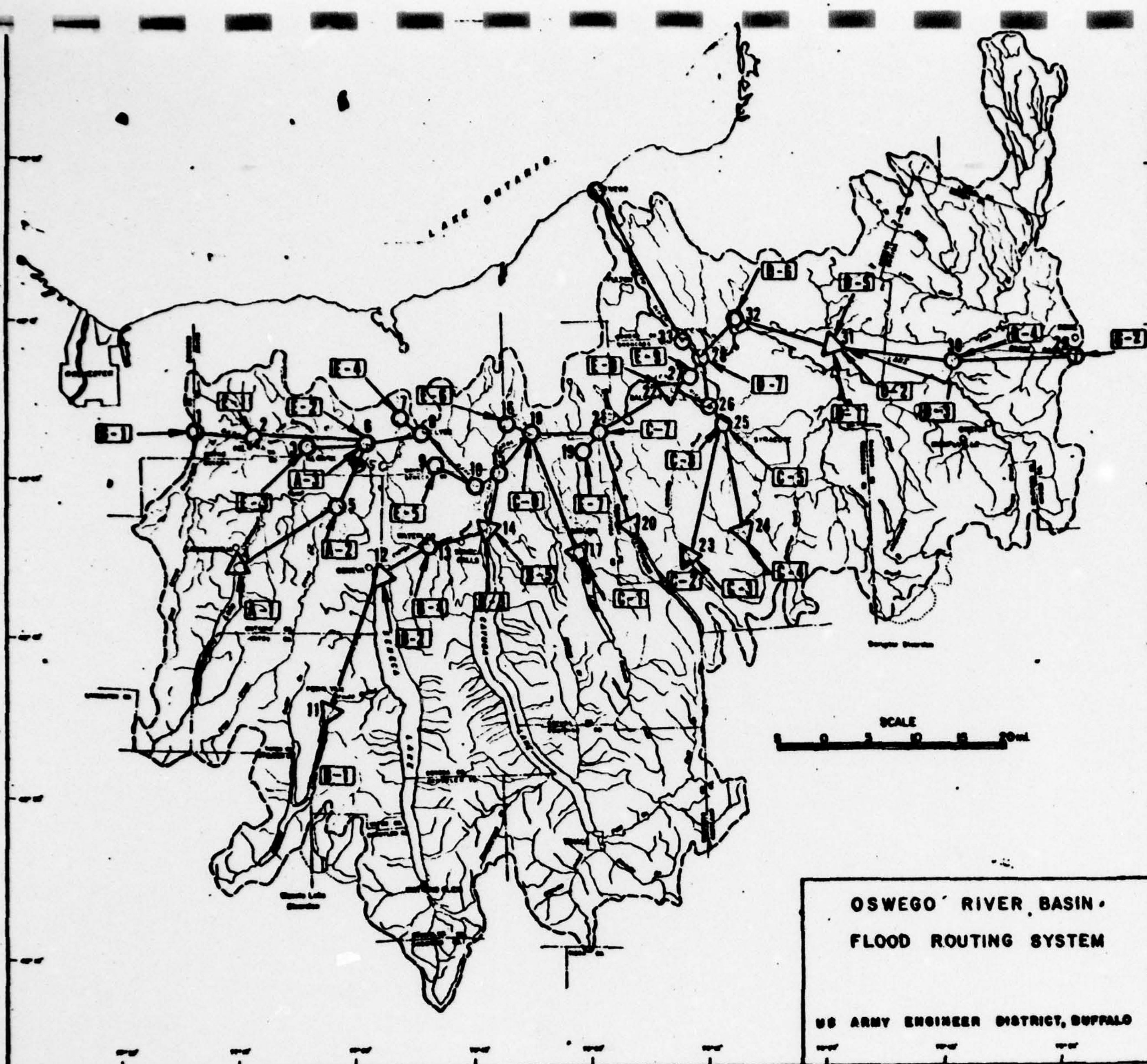
NOTE: DISCHARGE-FREQUENCY CURVE CONVERTED FROM STAGE-FREQUENCY CURVE, USING STAGE-DISCHARGE RATING CURVES DEVELOPED BY D.E.C.

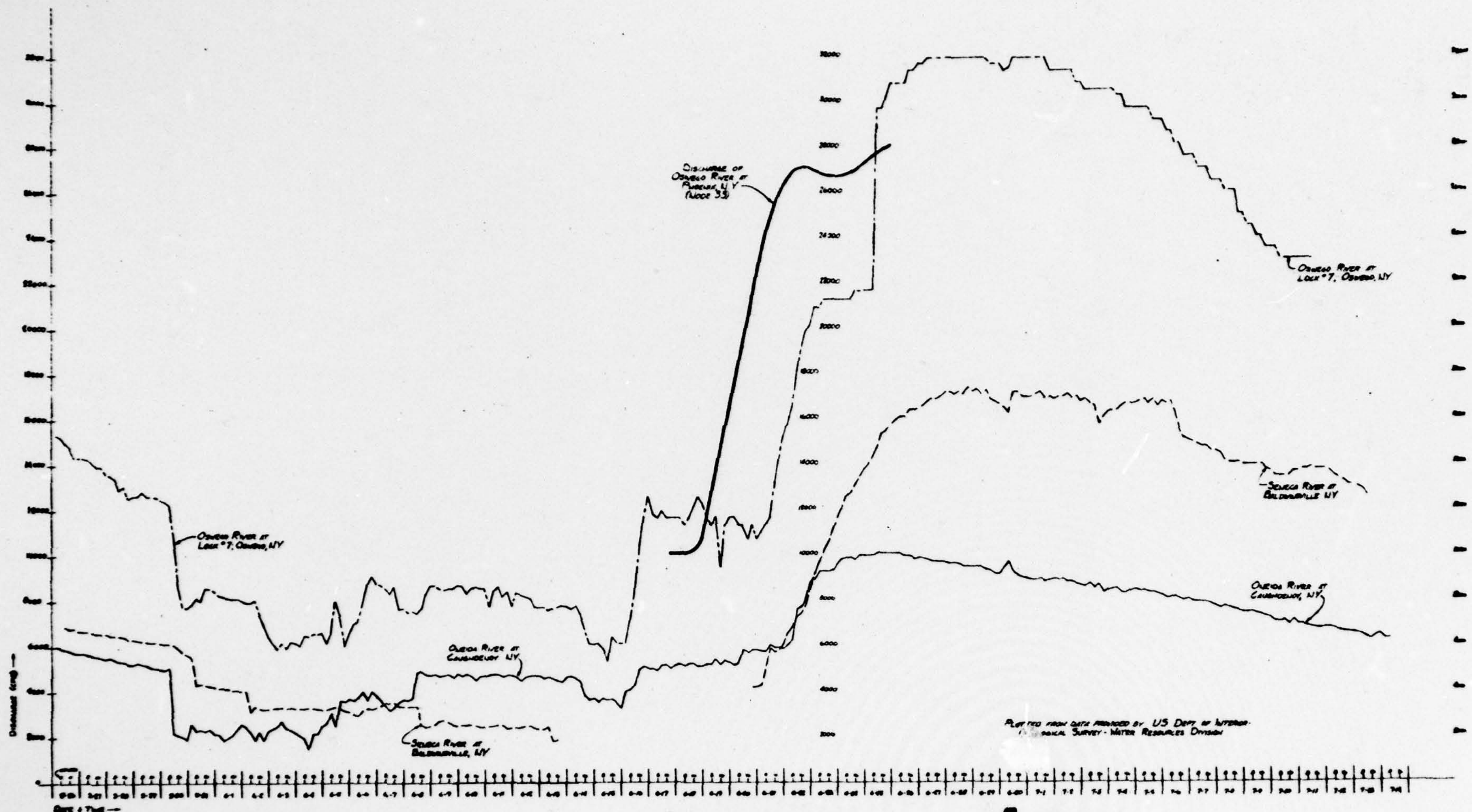
DISCHARGE - FREQUENCY CURVE

C-5

STETSON • DALE	DATE 6·27·79	DRAWN JPG	THREE RIVERS (NODE 28)
	JOB 2305	APP'D	


OSWEGO RIVER BASIN
SUB-BASINS AND SUB-AREAS
LAKE ONTARIO
SENECA LAKE
CAYUGA LAKE
ONEIDA LAKE
A1
A2
A3
B1
B2
B3
B4
B5
C1
C2
C3
C4
C5
C6
C7
C8
D1
D2
D3
D4
D5
D6
D7
E1
E2
E3
E4
E5
E6
E7
E8
E9
F


LAKE ONTARIO
SCALE
OSWEGO RIVER BASIN
FLOOD ROUTING SYSTEM
US ARMY ENGINEER DISTRICT, BUFFALO



DISCHARGE CURVES

OSWEGO RIVER WATERSHED

Water Year Ending September 1978

STETSON·DALE

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800 **DESIGN BRIEF**

PROJECT NAME New York State Dam Inspection DATE 6·28·79

SUBJECT Oswego River Curved Dam - Lock #7 PROJECT NO. 2305

Discharge - Frequency Ranking DRAWN BY JPG

Water Yr	Peak Discharge	Date	Ranking	Discharge Plot Posi
1936	37500 CFS	3·28·36	1	.02
1940	35000 CFS	4·10·40	2	.04
1972	32300 CFS	6·27·72	3	.06
1960	31200 CFS	4·4·60	4	.08
1950	29400 CFS	3·30·50	5	.11
1956	26800 CFS	4·13·56	6	.13
1942	25900 CFS	3·18·42	7	.15
1943	25400 CFS	5·15·43	8	.17
1947	25100 CFS	4·8·47	9	.19
1955	23600 CFS	3·23·55	10	.21
1951	23500 CFS	2·22·51	11	.23
1945	23400 CFS	3·26·45	12	.25
1939	23200 CFS	3·8·39	13	.28
1959	23100 CFS	4·6·59	14	.30
1973	23000 CFS	4·7·73	15	.32
1961	22700 CFS	2·26·61	16	.34
1971	22600 CFS	3·18·71	17	.36
1902	22,500 CFS	3·13·02	18	.38
1904	22200 CFS	4·02·04	19	.40
1946	22000 CFS	10·4·46	20	.42
1963	21900 CFS	3·28·63	21	.45
1970	21600 CFS	4·6·70	22	.47
1905	21300 CFS	3·28·05	23	.49
1937	21200 CFS	4·24·37	24	.51
1969	20900 CFS	2·4·69	25	.53
1903	20300 CFS	3·35·03	26	.55
1954	20000 CFS	5·9·54	27	.57
1941	19900 CFS	4·7·41	28	.60
1974	19900 CFS	4·7·74	29	.62
1958	19100 CFS	4·23·58	30	.64
1952	18700 CFS	3·12·52	31	.66
1948	18400 CFS	3·26·48	32	.68

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-28-79

SUBJECT OSWEGO RIVER CURVED DAM - LOCK #7 PROJECT NO. 2305

DISCHARGE - FREQUENCY RANKING DRAWN BY JPG

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT POSI
1968	18100 CFS	6·30·68	33	.70
1953	18000 CFS	3·28·53	34	.72
1938	18000 CFS	3·1·38	35	.74
1966	17600 CFS	3·6·66	36	.77
1964	17500 CFS	3·18·64	37	.79
1935	16900 CFS	7·14·35	38	.81
1934	16400 CFS	4·15·34	39	.83
1949	16300 CFS	2·17·49	40	.85
1944	16000 CFS	4·14·44	41	.87
1957	15200 CFS	3·15·57	42	.89
1962	15200 CFS	3·16·62	43	.91
1906	14900 CFS	4·10·06	44	.94
1965	13200 CFS	4·26·65	45	.96
1967	12900 CFS	5·17·67	46	.98

AD-A077 445 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. CURVED DAM-LOCK 7 (INVENTORY NUMBE--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
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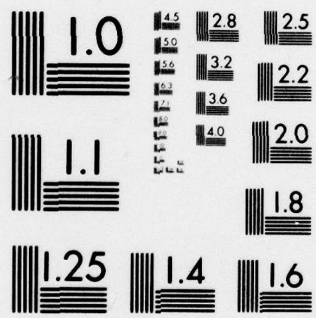
A077445

END
DATE
FILMED
12-79
DDC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-26-79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO. 2305

DRAWN BY: JPG & NFC

SENECA LAKE $Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$ ASSUME: $n = .035$

HEIGHT	1.49/n	A	R	S	Q	STORAGE
10	42.57	10600	10	.001	66745	800000
20	42.57	24800	20	.001	248455	1200000

CANANDAIGUA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106,500
10	42.57	10000	10	.001	62965	212,500
20	42.57	20000	20	.001	200366	319,000

KEUKA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94858	982000

OWASCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	205700

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6·27·79

SUBJECT EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS PROJECT NO. 2305

DRAWN BY JPG

OTISCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

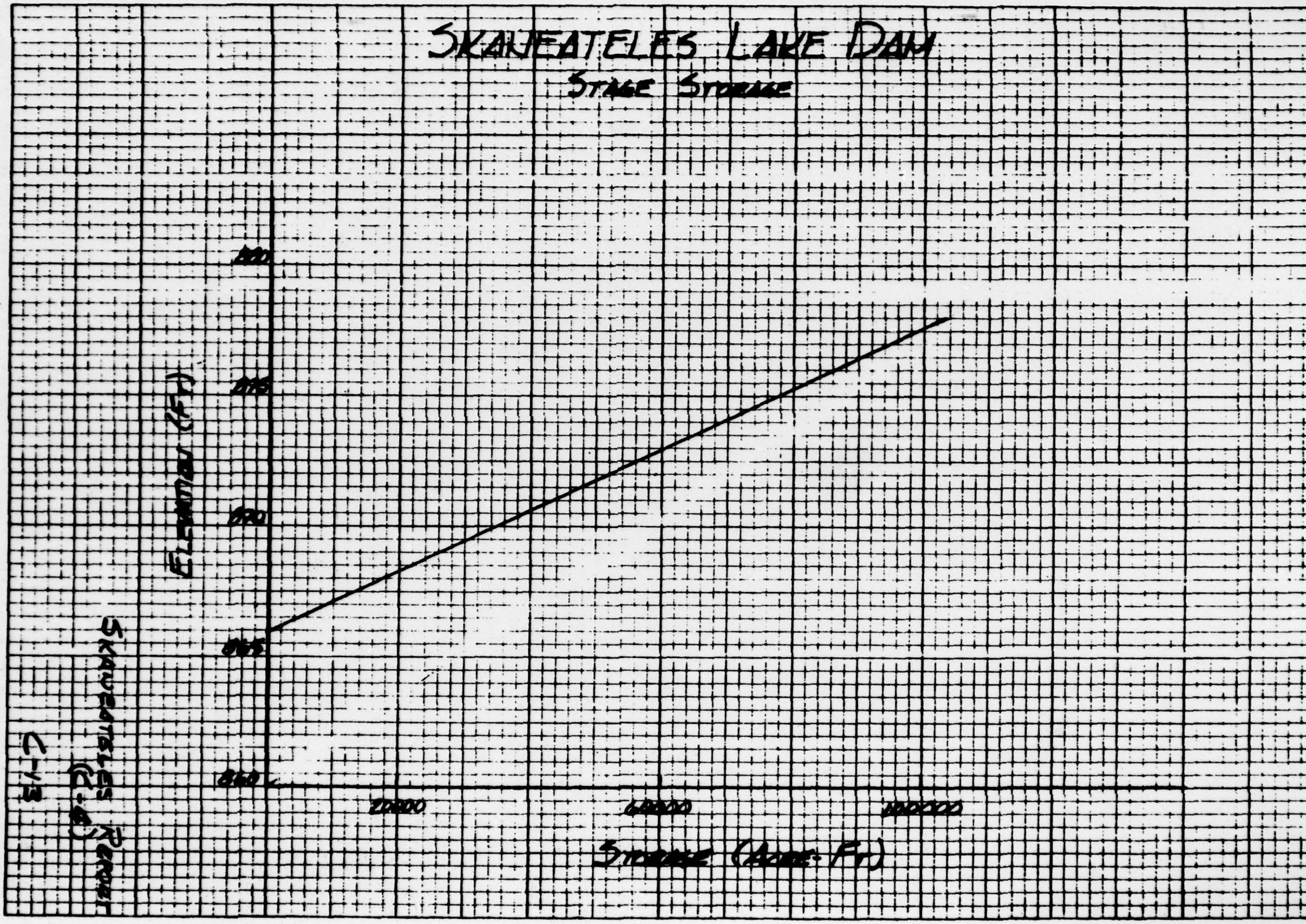
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	105600	1304000

SKANEATELES LAKE

SEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14
SHEETS C-4 & C-5


SKANEATELES LAKE DAM
STAGE STORAGE
ELEVATION (FT)
880
875
870
865
860
20000
60000
100000
STORAGE (ACRE-FT)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

ECT NAME NY DAM INSPECTION DATE 9-15-78

ECT SKANEATELES LAKE DAM PROJECT NO. 2210

DRAWN BY [illegible]

STAGE-DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

ELEV		Q PRINCIPAL SPILLWAY	Q DAM	Q TOTAL
866		—	—	—
867		124.80	—	124.80
868		352.99	—	352.99
868.5	(TOP OF DAM)	493.32	—	493.32
869		648.48	98.11	746.59
870		998.40	509.80	1508.20
871		1395.31	1096.92	2492.23
872		1834.18	1817.04	3651.22
873		2311.33	2649.00	4960.33
874		2823.90	3579.37	6403.27
875		3369.60	4598.68	7968.28
876		3946.52	5699.74	9646.26
877		4553.06	6876.88	11429.94
878		5187.84	8125.47	13313.31
879		5799.65	9491.63	15291.28
880		6537.42	10 822.06	17359.48

SKANEATELES REPORT
(C-5)
C-14

STATION 04249000 OSWEGO RIVER AT LOCK 7, OSWEGO, N.Y.

TOTAL D.A. = 5121.00 CONTR. D.A. =
GAGE DATUM = 246.00 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK.FT	CODE	ANNUAL MAX GAGE HT.FT	DATE	CODE
1901	20200	04-21-01	KR						
1902	22500	03-13-02	KR						
1903	20300	03-25-03	KR						
1904	22200	04-02-04	KR						
1905	21300	03-28-05	KR						
1906	14900	04-10-06	KR						
1934	16400	04-15-34	KR		8.22				
1935	16900	07-14-35	KR		8.32				
1936	37500	03-28-36	KR		13.10				
1937	21200	04-24-37	KR		9.10				
1938	18000	03-01-38	KR		8.55				
1939	23200	03-08-39	KR		9.87				
1940	35000	04-10-40	KR		13.46				
1941	19900	04-07-41	KR		9.19				
1942	25900	03-18-42	KR		11.09				
1943	25400	05-15-43	KR		10.92				
1944	16000	04-14-44	KR		8.15				
1945	23400	03-26-45	KR		10.34				
1946	22000	10-04-45	KR		9.94				
1947	25100	04-08-47	KR		11.07				
1948	18400	03-26-48	KR		9.05				
1949	16300	02-17-49	KR		8.42				
1950	29600	03-30-50	KR		12.17				
1951	23500	02-22-51	KR		10.38				
1952	18700	03-12-52	KR		9.00	NM	10.32	01-03-52	BW
1953	18000	03-28-53	KR		8.78				
1954	20000	05-09-54	KR		9.49				
1955	23600	03-23-55	KR		10.55				
1956	26800	04-13-56	KR		11.18				
1957	15200	03-15-57	KR		7.97				
1958	19100	04-23-58	KR		9.08				
1959	23100	04-06-59	KR		10.16				
1960	31200	04-04-60	KR		12.26				
1961	22700	02-26-61	KR		10.07				
1962	15200	03-16-62	KR		7.91				
1963	21900	03-28-63	KR		9.84				
1964	17500	03-18-64	KR		8.63				
1965	13200	04-26-65	KR		7.36				
1966	17600	03-06-66	KR		8.66				
1967	12900	05-17-67	KR		7.24				
1968	18100	06-30-68	KR		8.77				
1969	20900	02-04-69	KR		9.56				
1970	21600	04-06-70	KR		9.78				
1971	22600	03-18-71	MD KR					03-18-71	
1972	32300	06-27-72	MD KR			NM	11.87	06-29-72	
1973	23000	04-07-73	MD KR		10.05				
1974	19900	04-07-74	MD KR		9.57				

```
IA                        OSWEGO RIVER BASIN
A                              HEC1DB
A                         PMF- OVERFLOW ANALYSIS
B      40       6       0       0       0       0       0       0       4
B1      5
J       1       6       1
J1     .2      .4      .5      .6      .8     1.0
K       0       1       0       0       0       0       1
K1          1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)
M      -1       0     100       0    5100       0       0       0       1
N     372     372     372     372     374     378     379     379     386     392
N     390     380     375     372     113      23      25      21      21      22
N      22      21      22      22      21      21      22      22      22       0
N
K       1       2       0       0       0       0       1
K1          2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)
Y       0       0       0       0       1
Y1      0       3       1
K       0       2       0       0       0       0       1
K1          3 CANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)
M       1      -1     147       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      21
1     514    1946    2958    2655    1978    1472    1095     815     515     389
1     366     250     186     130     103      76      57      42      25      25
1      21
X     140     550     1.6
K       2       2       0       0       0       0       1
K1          4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29
K       1       6       0       0       0       0       1
K1          5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS
Y       0       0       0       0       1
Y1      0       8       3
K       0       6       0       0       0       0       1
K1          6 LOWER CANARACUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)
M       1      -1     118       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      27
1      28     109     293     523     696     773     896     980    1246    1312
1    1218     979     764     596     465     363     283     221     173     135
1     105      82      64      50      39      35      35
X     120     470     1.6
K       2       6       0       0       0       0       1
K1          7 COMBINED AND LOCAL FLOWS AT LOCK 27
K       0       3       0       0       0       0       1
K1          8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)
M       1      -1      51       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      10
1    2081    1638     844     383     174      79      36      30      25      16
X     100     200     1.6
K       1       6       0       0       0       0       1
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```
K1      9 ROUTED FLOW E-3 TO LYONS (NODE 6)
Y     0     0     0     0     1
Y1    0     5     2
K     2     6     0     0     0     0     1
K1      10 COMBINE FLOWS AT NODE 6
K     0     4     0     0     0     0     1
K1      11 CANANDAIGUA LAKE INFLOW
M     1    -1   184     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  1.25  0.03
U     8
1  8556  5183  3260  1507   691   316   145    30
I   300  1000   1.6
K     1     4     0     0     0     0     1
K1      12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 51000
Y2 10700 21300 31900 42500 53100 63700 74300 84900 95500 106100
Y2212500 319000
Y3   50    50    50    50   200   600  1000  1560  2250  3000
Y3 63000 200366
K     1     5     0     0     0     0     1
K1      13 ROUTED OUTFLOW TO FLINT CREEK MOUTH
Y     0     0     0     0     1
Y1    0    12     5
K     0     5     0     0     0     0     1
K1      14 FLINT CREEK INFLOW A-2
M     1    -1   102     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    26
1    93   534   903  1266  1367  1166   966   801   663   549
1   455   377   311   259   215   178   147   104   101    84
1    69    57    47    39    35    32
I    90  2000   1.6
K     2     5     0     0     0     0     1
K1      15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS
K     1    56     0     0     0     0     1
K1      16 OUTLET ROUTED TO LOCK 27
Y     0     0     0     0     1
Y1    0     7     3
K     0    56     0     0     0     0     1
K1      17 OUTLET LOCAL FLOW A-3
M     1    -1   155     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.6  0.06
U    22
1    91   338   905  1348  1718  2408  2601  1921  1413  1038
1   763   562   412   303   223   164   120    90    65    48
1    35    34
I   150   200   1.6
K     2    56     0     0     0     0     1
K1      18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
K     1     6     0     0     0     0     1
K1      19 ROUTE OUTLET TO CANAL
Y     0     0     0     0     1
Y1    0     1
K     2     6     0     0     0     0     1
K1      20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)
K     1     8     0     0     0     0     1
K1      21 ROUTE FLOWS AT LOCK 27 TO NODE 8
Y     0     0     0     0     1
Y1    0     8     3
K     0     7     0     0     0     0     1
K1      22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)
M     1    -1    89     0  5100     0     0     0     1
```

```
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.06
U     23
1    897   1670   1441   1144    908    721    572    454    361    287
1    227    181    143    114     90     72     57     45     36     29
1     23     23     23
X    100    360    1.6
K      1      8      0      0      0      0      1
K1       23 ROUTE FLOWS AT LOCK 26 TO NODE 8
Y      0      0      0      0      1
Y1     0      2
K      2      8      0      0      0      0      1
K1       24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8
K      1     10      0      0      0      0      1
K1       25 ROUTE FLOWS AT NODE 8 TO NODE 10
Y      0      0      0      0      1
Y1     0      5      2
K      0      9      0      0      0      0      1
K1       26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)
M      1     -1     18      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.06
U     21
1    171    304    313    246    193    152    119     93     73     58
1     45     35     28     22     17     13     11      8      6      5
1      4
X     90     90    1.6
K      1     10      0      0      0      0      1
K1       27 ROUTE INFLOW E-5 TO NODE 10
Y      0      0      0      0      1
Y1     0      2
K      2     10      0      0      0      0      1
K1       28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10
K      1     15      0      0      0      0      1
K1       29 ROUTE FLOWS AT NODE 10 TO NODE 15
Y      0      0      0      0      1
Y1     0      5      2
K      0     11      0      0      0      0      1
K1       30 LOCAL INFLOW B-1 INTO KEUKA LAKE
M      1     -1    183      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0   1.50   0.03
U      6
1  14318   3342   1273    483    183      0
X    100    800    1.6
K      1     11      0      0      0      0      1
K1       31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS
Y      0      0      0      1      1
Y1     0      0      0      0      0      0 147000
Y2107000 129500 141000 153500 172000 170000 191000 204000 217000
Y2320550
Y3   120    320    445    530    575    670    890   1130   1470
Y3126000
K      1     12      0      0      0      0      1
K1       32 ROUTE KEUKA LAKE OUTFLOWS TO 12
Y      0      0      0      0      1
Y1     0      6      2
K      0     12      0      0      0      0      1
K1       33 SENECA LAKE INFLOWS B-2
M      1     -1    524      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.03
U     12
1  26993  10831   6899   4332   2720   1700   1072    673    422    266
1    167     70
X    500   2000    1.6
```

```
K      2     12      0      0      0      0      1
K1       34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS
K      1     12      0      0      0      0      1
K1       35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD
Y      0      0      0      1      1
Y1                                       534000
Y2372000 414000 456000 500000 543000 586000 630000 650000 674000 720000
Y2000000 1200000
Y3   700    700    700    700    700    700    700   1000   3000   3000
Y3 15000  77000
K      1     13      0      0      0      0      1
K1       36 SENECA LAKE OUTFLOWS ROUTED TO 13
Y      0      0      0      0      1
Y1     0      2
K      0     13      0      0      0      0      1
K1       37 LOCAL INFLOW B-4
M      1     -1     39      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.05
U     15
1    539   1094    796    549    378    260    179    123     85     58
1     40     28     19     11     11
I     92    200    1.6
K      2     13      0      0      0      0      1
K1       38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4
K      1     14      0      0      0      0      1
K1       39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)
Y      0      0      0      0      1
Y1     0      6      2
K      0     14      0      0      0      0      1
K1       40 LOCAL INFLOW B-5
M      1     -1     36      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.05
U     12
1    895   1094    692    437    277    175    110     70     44     28
1     14     10
I     92    200    1.6
K      2     14      0      0      0      0      1
K1       41 COMBINE FLOW B-5 WITH ROUTED FLOW
K      0     14      0      0      0      0      1
K1       42 CAYUGA LAKE INFLOW B-3
M      1     -1    782      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.03
U     15
1  24903  15540  13526   9524   6529   4476   3069   2104   1443    989
1    678    465    319    219     81
I   1000   1700    1.6
K      2     14      0      0      0      0      1
K1       43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW
K      1     14      0      0      0      0      1
K1       44 CAYUGA LAKE OUTFLOW - MODIFIED PULS
Y      0      0      0      1      1
Y1     0      0      0      0      0      0 490000
Y2375000 417000 460000 503000 546000 589500 634000 660000 727000
Y2854500 982000
Y3  1700   1700   1700   1700   3400   3400   3400   8700   8700
Y3 30510 103500
K      1     15      0      0      0      0      1
K1       45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15
Y      0      0      0      0      1
Y1     0      3      1
K      2     15      0      0      0      0      1
K1       46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15
K      1     18      0      0      0      0      1
```

```
K1      47 ROUTE FLOWS TO NODE 18
T    0      0      0      0      1
T1   0      8      3
K    0     16      0      0      0      0      1
K1      48 LOCAL FLOW E-6
M    1     -1    191      0   5100      0      0      0      1
P    0   21.5     33     47     55     65     72     74
T    0      0      0      0      0      0    0.5   0.06
U   16
1 3051   5102   3130   2469   1710   1175    808    555    381    262
1  180    123     85     75     70     27
I  140    400    1.6
K    1     18      0      0      0      0      1
K1      49 ROUTE LOCAL FLOW E-6 TO NODE 18
T    0      0      0      0      1
T1   0      2
K    2     18      0      0      0      0      1
K1      50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18
K    0     17      0      0      0      0      1
K1      51 HEAD OWASCO INFLOW C-1
M    1     -1    201      0   5100      0      0      0      1
P    0   21.5     33     47     55     65     72     74
T    0      0      0      0      0      0   0.75    .05
U   10
1 6633   5878   4280   2273   1200    633    334    176     93     30
I  450   1000    1.6
K    1     17      0      0      0      0      1
K1      52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD
T    0      0      0      1      1
T1   0      0      0      0      0      0  92000
T2 66000  73200  79900  86500  93200  99800 106500 113200 119800 126500
T2152900 205700
T3  600    600    600   1100   1700   2300   2860   3400   3400   3400
T3 24000  69100
K    1     18      0      0      0      0      1
K1      53 ROUTE OWASCO LAKE OUTLET FLOWS
T    0      0      0      0      1
T1   0      7      3
K    2     18      0      0      0      0      1
K1      54 COMBINE FLOWS WITH FLOWS AT NODE 18
K    0     18      0      0      0      0      1
K1      55 READ LOCAL FLOW C-6
M    1     -1     19      0   5100      0      0      0      1
P    0   21.5     33     47     55     65     72     74
T    0      0      0      0      0      0    0.5   0.06
U   18
1  157    368    352    268    205    156    119     91     70     53
1   40     26     23     18     14     10      8      6
I   90    200    1.6
K    2     18      0      0      0      0      1
K1      56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18
K    1     21      0      0      0      0      1
K1      57 ROUTE FLOW AT 18 TO NODE 21
T    0      0      0      0      1
T1   0      7      3
K    0     19      0      0      0      0      1
K1      58 LOCAL INFLOW E-7
M    1     -1     90      0   5100      0      0      0      1
P    0   21.5     33     47     55     65     72     74
T    0      0      0      0      0      0    0.5   0.06
U   11
1 2769   3120   1870   1115    664    396    236    141     84     50
1   19
I  120    400    1.6
K    1     21      0      0      0      0      1
K1      59 ROUTE LOCAL FLOW TO NODE 21
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Y     0     0     0     0     1
Y1    0     6     2
K     2    21     0     0     0     0     1
K1      60 COMBINE ROUTED FLOW WITH FLOW AT 21
K     0    20     0     0     0     0     1
K1      61 SKANEATELES LAKE INFLOWS
M     1    -1    74     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.75  0.05
U     5
1  6039   791   232    56    10
X   250   500   1.6
K     1    20     0     0     0     0     1
K1      62 SKANEATELES LAKE OUTFLOWS
Y     0     0     0     1     1
Y1    0     0     0     0     0     0     0
Y2    0 17323 34756 52184 104368 208736 243492
Y3    0   353   747  1500  6403 13313 17359
K     1    21     0     0     0     0     1
K1      63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21
Y     0     0     0     0     1
Y1    0     6     2
K     2    21     0     0     0     0     1
K1      64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21
K     0    21     0     0     0     0     1
K1      65 LOCAL FLOW C-7
M     1    -1    27     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    11
1   496   940   581   351   212   127    77    46    28    17
1     7
X    90   200   1.6
K     2    21     0     0     0     0     1
K1      66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21
K     1    22     0     0     0     0     1
K1      67 ROUTING TO NODE 22
Y     0     0     0     0     1
Y1    0     4     1
K     0    22     0     0     0     0     1
K1      68  LOCAL FLOW E-8
M     1    -1    98     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U     7
1  4007  3059  1402   642   259   135    42
X   120   400   1.6
K     2    22     0     0     0     0     1
K1      69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22
K     1    22     0     0     0     0     1
K1      70 BALDWINSVILLE POOL - MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0  3250
Y2 3250  5000  8400 10000 11700 14000 17000 20000 24000 30000
Y3 3000  4000  6000  8000 10000 12000 14000 15300 16600 17000
K     1    26     0     0     0     0     1
K1      71 ROUTE FLOW TO NODE 26
Y     0     0     0     0     1
Y1    0     4     1
K     0    23     0     0     0     0     1
K1      72 INFLOW TO OTISCO LAKE C-3
M     1    -1  42.7     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.75  0.05
U     6
1  3092   913   397   139    55     9
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X     90    300    1.6
K      1     23      0      0      0      0      1
K1       73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD
Y      0      0      0      1      1
Y1     0      0      0      0      0      0  29300
Y2 19600  21800  23900  26100  28300  30500  32600  34800  37000  39200
Y2 45700  52300  58800  65300
Y3   200    200    200    200    200    400    900   1600   2000   2000
Y3  7060  18100  33700  53200
K      1     25      0      0      0      0      1
K1       74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25
Y      0      0      0      0      1
Y1     0     10      4
K      0     24      0      0      0      0      1
K1       75 INFLOW INTO ONONDAGA RESERVOIR   C-4
M      1     -1     68      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    1.5   0.06
U      6
1   2018   3341   1250    435    151     57
X    250    300    1.6
K      1     24      0      0      0      0      1
K1       76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD
Y      0      0      0      1      1
Y1     0      0      0      0      0      0      0
Y2     0    100    700   1980   3500   7940  18200  22200  27000  32500
Y2 43400  52300  62200  72100
Y3    80    430    660    880   1070   1420   1770   1840   2000   2000
Y3  6200  15400  28400  44700
K      1     25      0      0      0      0      1
K1       77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25
Y      0      0      0      0      1
Y1     0      8      3
K      2     25      0      0      0      0      1
K1       78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25
K      0     25      0      0      0      0      1
K1       79 LOCAL INFLOW C-5
M      1     -1    102      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0   1.25   0.06
U     11
1   2671   3269   2030   1215    727    436    261    156     77     56
1     27
X    250    500    1.6
K      2     25      0      0      0      0      1
K1       80 COMBINE ROUTED FLOWS, LOCAL INFLOW
K      0     25      0      0      0      0      1
K1       81 LOCAL FLOW C-8
M      1     -1     72      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    1.0    .06
U     14
1    459   1455   1854   1454    926    590    376    239    152     97
1     62     39     25     12
X    250    300    1.6
K      2     25      0      0      0      0      1
K1       82 COMBINE LOCAL FLOW AT NODE 25
K      1     26      0      0      0      0      1
K1       83 ROUTE FLOWS TO NODE 26
Y      0      0      0      0      1
Y1     0      8      3
K      2     26      0      0      0      0      1
K1       84 COMBINE ROUTED FLOW AND FLOW AT NODE 26
K      1     28      0      0      0      0      1
K1       85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)
Y      0      0      0      0      1
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Y1    0     6     2
K     0    27     0     0     0     0     1
K1      86 LOCAL FLOW  (E-9)  AT NODE 27
M     1    -1    37     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U     6
1  2140  1119   437   171    67    11
X   100   150   1.6
K     1    28     0     0     0     1
K1      87 ROUTE LOCAL FLOW E-9 TO NODE 28
Y     0     0     0     0     1
Y1    0     3     1
K     2    28     0     0     0     0     1
K1      88 COMBINE HYDROGRAPHS AT 28
K     0    29     0     0     0     0     1
K1      89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN   (C-2)
M    -1     0   100     0  5100     0     0     0     1
M
M
M
M
K     1    30     0     0     0     0     1
K1      90 ROUTE FLOW AT NODE 29 TO NODE 30
Y     0     0     0     0     1
Y1    0     7     3
K     0    30     0     0     0     0     1
K1      91 LOCAL INFLOW D-4
M     1    -1   529     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    15
1   940  4797 11098 12780 10280  6513  4014  2473  1524   939
1   579   356   220   140   102
X   800  3960   1.6
K     2    30     0     0     0     0     1
K1      92 COMBINE LOCAL FLOW WITH ROUTED FLOW
K     1    31     0     0     0     0     1
K1      93 ROUTE FLOWS TO NODE 31
Y     0     0     0     0     1
Y1    0     1
K     0    31     0     0     0     0     1
K1      94 LOCAL FLOW D-3
M     1    -1   144     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
1   370  1076  2155  2396  2356  1742  1289   953   705   522
1   386   286   183   156   115    85    63    47    34    30
1    30    30    30    24
X   320  1080   2.0
K     2    31     0     0     0     0     1
K1      95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      96 LOCAL FLOW D-2
M     1    -1   105     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    14
1   353  1862  2750  2357  1404   929   581   363   227   142
1    89    49    35    18
X   240   800   1.6
K     2    31     0     0     0     0     1
K1      97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      98 LOCAL FLOW D-1
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M     1    -1   280     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
1   103   504  1042  1512  2516  3758  4112  4139  3602  2645
1  1916  1204   866   727   527   320   276   200   145   105
1    76    55    50    50
X   600  2160   1.6
K     2    31     0     0     0     0     1
K1       99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      100 LOCAL FLOW D-5
M     1    -1   269     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.05
U    12
1 12227  5835  4245  2585  1574   958   583   355   216   132
1    80    36
X   540  2000   1.6
K     2    31     0     0     0     0     1
K1      101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31
K     1    31     0     0     0     0     1
K1      102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 670000
Y2442000 635000 640000 650000 680000 735000 806000 845000
Y2990000 1150000 1304000
Y3 1000  1000  2000  4000  6000  8000 10000 11000
Y3 27900  64700 116600
K     1    32     0     0     0     0     1
K1      103 ROUTE FLOWS TO NODE 32
Y     0     0     0     0     1
Y1    0     1
K     0    32     0     0     0     0     1
K1      104 LOCAL FLOW D-6
M     1    -1    28     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    15
1   274   531   681   491   330   233   160   110    76    53
1    36    25    18    12     7
X    70   210   1.6
K     2    32     0     0     0     0     1
K1      105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32
K     1    28     0     0     0     0     1
K1      106 ROUTE FLOW AT 32 TO NODE 28
Y     0     0     0     0     1
Y1    0     6     2
K     2    28     0     0     0     0     1
K1      107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28
K     0    28     0     0     0     0     1
K1      108 LOCAL FLOW D-7
M     1    -1   110     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    77
T     0     0     0     0     0     0   0.5  0.06
U    24
1   602  1403  1808  1872  1496  1127   849   536   402   363
1   273   206   155   117    88    67    50    38    28    22
1    20    20    20     0
X   250   800   2.0
K     2    28     0     0     0     1     1
K1      109 COMBINE WITH FLOW AT NODE 28
K     1    33     0     0     0     1     1
K1      110 ROUTE FLOW AT 28 TO NODE 33
Y     0     0     0     0     1
Y1    0     3     1
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DROUT 14:31 JUN 27,'79

1********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
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1 PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

```
RUNOFF HYDROGRAPH AT          1
ROUTE HYDROGRAPH TO           2
RUNOFF HYDROGRAPH AT          2
COMBINE  2 HYDROGRAPHS AT     2
ROUTE HYDROGRAPH TO           6
RUNOFF HYDROGRAPH AT          6
COMBINE  2 HYDROGRAPHS AT     6
RUNOFF HYDROGRAPH AT          3
ROUTE HYDROGRAPH TO           6
COMBINE  2 HYDROGRAPHS AT     6
RUNOFF HYDROGRAPH AT          4
ROUTE HYDROGRAPH TO           4
ROUTE HYDROGRAPH TO           5
RUNOFF HYDROGRAPH AT          5
COMBINE  2 HYDROGRAPHS AT     5
ROUTE HYDROGRAPH TO          56
RUNOFF HYDROGRAPH AT         56
COMBINE  2 HYDROGRAPHS AT    56
ROUTE HYDROGRAPH TO           6
COMBINE  2 HYDROGRAPHS AT     6
ROUTE HYDROGRAPH TO           8
RUNOFF HYDROGRAPH AT          7
ROUTE HYDROGRAPH TO           8
COMBINE  2 HYDROGRAPHS AT     8
ROUTE HYDROGRAPH TO          10
RUNOFF HYDROGRAPH AT          9
ROUTE HYDROGRAPH TO          10
COMBINE  2 HYDROGRAPHS AT    10
ROUTE HYDROGRAPH TO          15
RUNOFF HYDROGRAPH AT         11
ROUTE HYDROGRAPH TO          11
ROUTE HYDROGRAPH TO          12
RUNOFF HYDROGRAPH AT         12
COMBINE  2 HYDROGRAPHS AT    12
ROUTE HYDROGRAPH TO          12
ROUTE HYDROGRAPH TO          13
RUNOFF HYDROGRAPH AT         13
COMBINE  2 HYDROGRAPHS AT    13
ROUTE HYDROGRAPH TO          14
RUNOFF HYDROGRAPH AT         14
COMBINE  2 HYDROGRAPHS AT    14
RUNOFF HYDROGRAPH AT         14
COMBINE  2 HYDROGRAPHS AT    14
ROUTE HYDROGRAPH TO          14
ROUTE HYDROGRAPH TO          15
COMBINE  2 HYDROGRAPHS AT    15
ROUTE HYDROGRAPH TO          18
RUNOFF HYDROGRAPH AT         18
ROUTE HYDROGRAPH TO          18
COMBINE  2 HYDROGRAPHS AT    18
RUNOFF HYDROGRAPH AT         17
ROUTE HYDROGRAPH TO          17
ROUTE HYDROGRAPH TO          16
COMBINE  2 HYDROGRAPHS AT    [illegible]
RUNOFF HYDROGRAPH AT         16
[illegible]
```

COMBINE 2 HYDROGRAPHS AT 18
ROUTE HYDROGRAPH TO 21
RUNOFF HYDROGRAPH AT 19
ROUTE HYDROGRAPH TO 21
COMBINE 2 HYDROGRAPHS AT 21
RUNOFF HYDROGRAPH AT 20
ROUTE HYDROGRAPH TO 20
ROUTE HYDROGRAPH TO 21
COMBINE 2 HYDROGRAPHS AT 21
RUNOFF HYDROGRAPH AT 21
COMBINE 2 HYDROGRAPHS AT 21
ROUTE HYDROGRAPH TO 22
RUNOFF HYDROGRAPH AT 22
COMBINE 2 HYDROGRAPHS AT 22
ROUTE HYDROGRAPH TO 22
ROUTE HYDROGRAPH TO 26
RUNOFF HYDROGRAPH AT 23
ROUTE HYDROGRAPH TO 23
ROUTE HYDROGRAPH TO 25
RUNOFF HYDROGRAPH AT 24
ROUTE HYDROGRAPH TO 24
ROUTE HYDROGRAPH TO 25
COMBINE 2 HYDROGRAPHS AT 25
RUNOFF HYDROGRAPH AT 25
COMBINE 2 HYDROGRAPHS AT 25
RUNOFF HYDROGRAPH AT 25
COMBINE 2 HYDROGRAPHS AT 25
ROUTE HYDROGRAPH TO 26
COMBINE 2 HYDROGRAPHS AT 26
ROUTE HYDROGRAPH TO 28
RUNOFF HYDROGRAPH AT 27
ROUTE HYDROGRAPH TO 28
COMBINE 2 HYDROGRAPHS AT 28
RUNOFF HYDROGRAPH AT 29
ROUTE HYDROGRAPH TO 30
RUNOFF HYDROGRAPH AT 30
COMBINE 2 HYDROGRAPHS AT 30
ROUTE HYDROGRAPH TO 31
RUNOFF HYDROGRAPH AT 31
COMBINE 2 HYDROGRAPHS AT 31
RUNOFF HYDROGRAPH AT 31
COMBINE 2 HYDROGRAPHS AT 31
RUNOFF HYDROGRAPH AT 31
COMBINE 2 HYDROGRAPHS AT 31
RUNOFF HYDROGRAPH AT 31
COMBINE 2 HYDROGRAPHS AT 31
ROUTE HYDROGRAPH TO 31
ROUTE HYDROGRAPH TO 32
RUNOFF HYDROGRAPH AT 32
COMBINE 2 HYDROGRAPHS AT 32
ROUTE HYDROGRAPH TO 28
COMBINE 2 HYDROGRAPHS AT 28
RUNOFF HYDROGRAPH AT 28
COMBINE 2 HYDROGRAPHS AT 28
ROUTE HYDROGRAPH TO 33
END OF NETWORK

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

RUN DATE# 79/06/27.
TIME# 13.35.35.

```
                    OSWEGO RIVER BASIN
                         HEC1DB
                  PMF- OVERFLOW ANALYSIS

                            JOB SPECIFICATION
     NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
     40        6        0        0        0        0        0        0        4        0
                             JOPER      NWT    LROPT    TRACE
                                 5        0        0        0


                   MULTI-PLAN ANALYSES TO BE PERFORMED
                      NPLAN= 1 NRTIO= 6 LRTIO= 1
          RTIOS=    .20    .40    .50    .60    .80   1.00


**********        **********        **********        **********        **********

                         SUB-AREA RUNOFF COMPUTATION

        1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        1       0       0       0       0       0       1       0       0

                              HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
        -1       0  100.00    0.00 5100.00    0.00   0.000       0       1       0


**********        **********        **********        **********        **********

                             HYDROGRAPH ROUTING

        2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        2       1       0       0       0       0       1       0       0
                                  ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       0       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       3       1   0.000   0.000   0.000      0.       0


**********        **********        **********        **********        **********

                         SUB-AREA RUNOFF COMPUTATION

        3 CANANDAIGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        2       0       0       0       0       0       1       0       0

                              HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
         1      -1  147.00    0.00 5100.00    0.00   0.000       0       1       0

                                PRECIP DATA
```

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 140.00 QRCSN= 550.00 RTIOR= 1.60

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	186787.
										(377.)	(294.)	(84.)	(5289.22)

********* ********* ********* ********* *********

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	2	0	0	0	0	1	0	0

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

********* ********* ********* ********* *********

SUB-AREA RUNOFF COMPUTATION

6 LOWER CANANDAGUA LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	118.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 470.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.56 3.30 147318.
(377.)(294.)(84.)(4171.58)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	51.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 200.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.56 3.30 65053.
(377.)(294.)(84.)(1842.10)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (NODE 6)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

********* ********* ********* ********* *********

COMBINE HYDROGRAPHS

10 COMBINE FLOWS AT NODE 6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

********* ********* ********* ********* *********

SUB-AREA RUNOFF COMPUTATION

11 CANANDAIGUA LAKE INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	184.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.25	.03	0.00	0.00

RECESSION DATA

STRTQ= 300.00 QRCSN= 1000.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	12.00	2.86	252691.
										(377.)	(305.)	(73.)	(7155.41)

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

```
                  QLOSS   CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                    0.0   0.000   0.00      1      1      0      0             0

                          NSTPS   NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                              0       0      0  0.000  0.000  0.000  51000.      0

STORAGE    10700.00   21300.00   31900.00   42500.00   53100.00   63700.00   74300.00   84900.00   95500.00  106100.00
          212500.00  319000.00

OUTFLOW       50.00      50.00      50.00      50.00     200.00     600.00    1000.00    1560.00    2250.00    3000.00
           63000.00  200366.00


          *********        *********        *********        *********        *********

                                     HYDROGRAPH ROUTING

               13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

                          ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                              5       1       0       0      0      0       1       0      0
                                           ROUTING DATA
                  QLOSS   CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                    0.0   0.000   0.00      0      1      0      0             0

                          NSTPS   NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                              0      12      5  0.000  0.000  0.000     0.      0


                                     SUB-AREA RUNOFF COMPUTATION

               14 FLINT CREEK INFLOW A-2

                          ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                              5       0       0       0      0      0       1       0      0

                                         HYDROGRAPH DATA
               IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1      -1  102.00    0.00 5100.00    0.00   0.000       0       1       0

                                           PRECIP DATA
                       SPFE     PMS      R6     R12     R24     R48     R72     R96
                       0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                            LOSS DATA
           LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
               0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                          RECESSION DATA
                        STRTQ=   90.00    QRCSN= 2000.000   RTIOR= 1.60

        0                                END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                        SUM  14.86  11.08   3.78  133407.
                                                                          ( 377.)( 281.)(  96.)( 3779.93)


          *********        *********        *********        *********        *********
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                              COMBINE HYDROGRAPHS

              15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          5       2       0       0       0       0       1       0       0


      *********       *********       *********       *********       *********

                               HYDROGRAPH ROUTING

              16 OUTLET ROUTED TO LOCK 27

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         56       1       0       0       0       0       1       0       0
                                          ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                0.0   0.000    0.00       0       1       0       0                0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       7       3   0.000   0.000   0.000      0.       0


      *********       *********       *********       *********       *********

                            SUB-AREA RUNOFF COMPUTATION

              17 OUTLET LOCAL FLOW A-3

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         56       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1      -1  155.00    0.00 5100.00    0.00   0.000       0       1       0

                                          PRECIP DATA
                   SPFE     PMS      R6     R12     R24     R48     R72     R96
                   0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                           LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.00    0.00    1.00    0.00    0.00    1.00     .60     .06    0.00    0.00

                                         RECESSION DATA
                          STRTQ=  150.00    QRCSN=  200.00    RTIOR= 1.60

           0                              END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                   SUM  14.86  11.06   3.80   187176.
                                                                      ( 377.)( 281.)(  97.)( 5300.23)


      *********       *********       *********       *********       *********

                               COMBINE HYDROGRAPHS

              18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
```

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

19 ROUTE OUTLET TO CANAL

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

COMBINE HYDROGRAPHS

20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

21 ROUTE FLOWS AT LOCK 27 TO NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

SUB-AREA RUNOFF COMPUTATION

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	89.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

```
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                       LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                     RECESSION DATA
                           STRTQ=  100.00   QRCSN=  360.00   RTIOR= 1.60

        0                           END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  14.86  11.08   3.78  109181.
                                                                             ( 377.)( 281.)(  96.)( 3091.66)


         **********        **********        **********        **********        **********

                                   HYDROGRAPH ROUTING

                 23 ROUTE FLOWS AT LOCK 26 TO NODE 8

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             8       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       2       0   0.000   0.000   0.000      0.       0


         **********        **********        **********        **********        **********

                                  COMBINE HYDROGRAPHS

                 24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             8       2       0       0       0       0       1       0       0


         **********        **********        **********        **********        **********

                                   HYDROGRAPH ROUTING

                 25 ROUTE FLOWS AT NODE 8 TO NODE 10

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            10       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       5       2   0.000   0.000   0.000      0.       0


         **********        **********        **********        **********        **********

                                SUB-AREA RUNOFF COMPUTATION
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SUB-AREA RUNOFF COMPUTATION

26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	18.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 90.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	23275.
										(377.)	(281.)	(96.)	(659.07)

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********* ********* ********* ********* *********

COMBINE HYDROGRAPHS

28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

```
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       15       1       0       0       0       0       1       0       0
                                       ROUTING DATA
             QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0   0.000    0.00       0       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       5       2   0.000   0.000   0.000      0.       0


     **********      **********      **********      **********      **********

                               SUB-AREA RUNOFF COMPUTATION

             30 LOCAL INFLOW B-1 INTO KEUKA LAKE

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       11       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
         IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             1      -1  183.00    0.00 5100.00    0.00   0.000       0       1       0

                                       PRECIP DATA
                  SPFE     PMS      R6     R12     R24     R48     R72     R96
                  0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                         LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
         0    0.00    0.00    1.00    0.00    0.00    1.00    1.50     .03    0.00    0.00

                                       RECESSION DATA
                          STRTQ=  100.00    QRCSN=  800.00    RTIOR= 1.60

  0                                  END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                     SUM  14.86  11.79   3.07  242812.
                                                                        ( 377.)( 299.)(  78.)( 6875.67)


     **********      **********      **********      **********      **********

                                    HYDROGRAPH ROUTING

             31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       11       1       0       0       0       0       1       0       0
                                       ROUTING DATA
             QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0   0.000    0.00       1       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       0       0   0.000   0.000   0.000 147000.       0

STORAGE    107000.00   129500.00   141000.00   153500.00   172000.00   178000.00   191000.00   204000.00   217000.00        0.00
           328550.00

OUTFLOW       120.00      320.00      445.00      530.00      575.00      670.00      890.00     1130.00     1470.00        0.00
           126000.00
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**********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

              32 ROUTE KEUKA LAKE OUTFLOWS TO 12

                     ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT   INAME  ISTAGE   IAUTO
                        12       1       0       0      0       0       1       0       0
                                          ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                     NSTPS   NSTDL     LAG  AMSKK       X     TSK   STORA  ISPRAT
                         0       6       2  0.000   0.000   0.000      0.       0


**********          **********          **********          **********          **********

                                SUB-AREA RUNOFF COMPUTATION

              33 SENECA LAKE INFLOWS B-2

                     ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT   INAME  ISTAGE   IAUTO
                        12       0       0       0      0       0       1       0       0

                                         HYDROGRAPH DATA
         IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             1      -1  524.00    0.00 5100.00    0.00   0.000       0       1       0

                                          PRECIP DATA
               SPFE     PMS      R6     R12     R24     R48     R72     R96
               0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                           LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .03    0.00    0.00

                                        RECESSION DATA
                            STRTQ=  500.00     QRCSN= 2000.00     RTIOR= 1.60

       0                                END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                       SUM  14.86  12.52   2.34   741890.
                                                                          ( 377.)( 318.)(  59.)(21007.99)


**********          **********          **********          **********          **********

                                     COMBINE HYDROGRAPHS

              34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

                     ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT   INAME  ISTAGE   IAUTO
                        12       2       0       0      0       0       1       0       0


**********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING
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                                HYDROGRAPH ROUTING

                   35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           12       1       0       0       0       0       1       0       0
                                               ROUTING DATA
                  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0   0.000    0.00       1       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       0       0   0.000   0.000   0.000 534000.       0

STORAGE   372000.00   414000.00   456000.00   500000.00   543000.00   586000.00   630000.00   650000.00   674000.00   720000.00
          800000.00  1200000.00

OUTFLOW      700.00      700.00      700.00      700.00      700.00      700.00      700.00     1000.00     3000.00     3000.00
           15000.00    77000.00


          **********        **********        **********        **********        **********

                                       HYDROGRAPH ROUTING

                   36 SENECA LAKE OUTFLOWS ROUTED TO 13

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           13       1       0       0       0       0       1       0       0
                                               ROUTING DATA
                  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       2       0   0.000   0.000   0.000      0.       0


          **********        **********        **********        **********        **********

                                   SUB-AREA RUNOFF COMPUTATION

                   37 LOCAL INFLOW B-4

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           13       0       0       0       0       0       1       0       0

                                               HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1      -1   39.00    0.00 5100.00    0.00   0.000       0       1       0

                                                 PRECIP DATA
                         SPFE     PMS      R6     R12     R24     R48     R72     R96
                         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                  LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                                RECESSION DATA
                                STRTQ=   92.00    QRCSN=  200.00    RTIOR= 1.60

           0                                   END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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                                                                SUM  14.86  11.56   3.30    51530.
                                                                  ( 377.)( 294.)(  84.)( 1459.17)


          **********        **********        **********        **********        **********

                                        COMBINE HYDROGRAPHS

              38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           13       2       0       0       0       0       1       0       0


          **********        **********        **********        **********        **********

                                        HYDROGRAPH ROUTING

              39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           14       1       0       0       0       0       1       0       0
                                            ROUTING DATA
              QLOSS     CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0     0.000    0.00       0       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            0       6       2   0.000   0.000   0.000      0.       0


          **********        **********        **********        **********        **********

                                     SUB-AREA RUNOFF COMPUTATION

              40 LOCAL INFLOW B-5

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           14       0       0       0       0       0       1       0       0

                                           HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
               1      -1   36.00    0.00 5100.00    0.00   0.000       0       1       0

                                             PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                           RECESSION DATA
                        STRTQ=   92.00   QRCSN=  200.00   RTIOR= 1.60

        0                                END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                SUM  14.86  11.56   3.30    47972.
                                                                  ( 377.)( 294.)(  84.)( 1358.42)
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          **********          **********          **********          **********          **********

                                        COMBINE HYDROGRAPHS

                      41 COMBINE FLOW B-5 WITH ROUTED FLOW

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                                 14      2      0      0      0      0      1      0      0


          **********          **********          **********          **********          **********

                                        SUB-AREA RUNOFF COMPUTATION

                      42 CAYUGA LAKE INFLOW B-3

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                                 14      0      0      0      0      0      1      0      0

                                        HYDROGRAPH DATA
                 IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
                     1     -1 782.00   0.00 5100.00  0.00  0.000      0      1      0

                                        PRECIP DATA
                         SPFE    PMS     R6    R12    R24    R48    R72    R96
                         0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
              LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                  0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .03   0.00   0.00

                                        RECESSION DATA
                              STRTQ= 1000.00   QRCSN= 1700.00   RTIOR= 1.60

           0                            END-OF-PERIOD FLOW
    MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                   SUM  14.86  12.52   2.34  1081195.
                                                                      ( 377.)( 318.)(  59.)(30616.03)


          **********          **********          **********          **********          **********

                                        COMBINE HYDROGRAPHS

                      43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                                 14      2      0      0      0      0      1      0      0


          **********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

                      44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                                 14      1      0      0      0      0      1      0      0
```

```
                                         ROUTING DATA
                    QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                      0.0  0.000   0.00      1      1      0      0             0

                           NSTPS  NSTDL    LAC  AMSKK      X    TSK  STORA ISPRAT
                               0      0      0  0.000  0.000  0.000 490000.     0

STORAGE   375000.00  417000.00  460000.00  503000.00  546000.00  589500.00  634000.00  660000.00  727000.00       0.00
          854500.00  982000.00

OUTFLOW     1700.00    1700.00    1700.00    1700.00    3400.00    3400.00    3400.00    8700.00    8700.00       0.00
           30510.00  103500.00


          **********        **********        **********        **********        **********

                                      HYDROGRAPH ROUTING

                    45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15

                           ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                              15      1      0      0      0      0      1      0      0
                                         ROUTING DATA
                    QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                      0.0  0.000   0.00      0      1      0      0             0

                           NSTPS  NSTDL    LAC  AMSKK      X    TSK  STORA ISPRAT
                               0      3      1  0.000  0.000  0.000     0.      0


          **********        **********        **********        **********        **********

                                      COMBINE HYDROGRAPHS

                    46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

                           ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                              15      2      0      0      0      0      1      0      0


          **********        **********        **********        **********        **********

                                      HYDROGRAPH ROUTING

                    47 ROUTE FLOWS TO NODE 18

                           ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                              18      1      0      0      0      0      1      0      0
                                         ROUTING DATA
                    QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                      0.0  0.000   0.00      0      1      0      0             0

                           NSTPS  NSTDL    LAC  AMSKK      X    TSK  STORA ISPRAT
                               0      0      3  0.000  0.000  0.000     0.      0


          **********        **********        **********        **********        **********

                                    SUB-AREA RUNOFF COMPUTATION

                    48 LOCAL FLOW E-6
```

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	191.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 140.00 QRCSN= 400.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	227590.
										(377.)	(281.)	(96.)	(6444.63)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

51 HEAD QUASCO INFLOW C-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

```
                    INTDG   IUNG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1      -1   201.00    0.00 5100.00    0.00   0.000      0       1       0

                                                 PRECIP DATA
                              SPFE     PMS      R6     R12     R24     R48     R72     R96
                              0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                  LOSS DATA
                 LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                     0    0.00    0.00    1.00    0.00    0.00    1.00     .75     .05    0.00    0.00

                                               RECESSION DATA
                              STRTQ=  450.00   QRCSN= 1000.00   RTIOR= 1.40

          0                                   END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS     COMP Q


                                                                          SUM  14.86  11.46   3.39  264813.
                                                                             ( 377.)( 291.)(  86.)( 7498.67)



              **********      **********      **********      **********      **********

                                              HYDROGRAPH ROUTING

                         52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                   17       1       0       0       0       0       1       0       0
                                                    ROUTING DATA
                         QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                           0.0   0.000    0.00       1       1       0       0               0

                                NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                    0       0       0   0.000   0.000   0.000  92000.       0

STORAGE    66000.00    73200.00    79900.00    86500.00    93200.00    99800.00   106500.00   113200.00   119800.00   126500.00
          152900.00   285700.00

OUTFLOW      600.00      600.00      600.00     1100.00     1700.00     2300.00     2860.00     3400.00     3400.00     3400.00
           24000.00    69100.00



              **********      **********      **********      **********      **********

                                              HYDROGRAPH ROUTING

                         53 ROUTE OWASCO LAKE OUTLET FLOWS

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                   18       1       0       0       0       0       1       0       0
                                                    ROUTING DATA
                         QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                           0.0   0.000    0.00       0       1       0       0               0

                                NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                    0       7       3   0.000   0.000   0.000      0.       0



              **********      **********      **********      **********      **********

                                              COMBINE HYDROGRAPHS
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                         COMBINE HYDROGRAPHS

       54 COMBINE FLOWS WITH FLOWS AT NODE 18

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 18      2      0      0      0      0      1      0      0


  *********   *********   *********   *********   *********

                        SUB-AREA RUNOFF COMPUTATION

       55 READ LOCAL FLOW C-6

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 18      0      0      0      0      0      1      0      0

                              HYDROGRAPH DATA
        IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
            1     -1  19.00   0.00 5100.00  0.00  0.000      0      1      0

                               PRECIP DATA
                 SPFE    PMS     R6    R12    R24    R48    R72    R96
                 0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                LOSS DATA
     LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
         0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                              RECESSION DATA
                 STRTQ=   90.00   QRCSN=  200.00   RTIOR= 1.60

      0                       END-OF-PERIOD FLOW
  NO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q     NO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                          SUM  14.86  11.08  3.78   25048.
                                                             ( 377.)( 281.)( 96.)( 710.41)


  *********   *********   *********   *********   *********

                           COMBINE HYDROGRAPHS

       56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 18      2      0      0      0      0      1      0      0


  *********   *********   *********   *********   *********

                           HYDROGRAPH ROUTING

       57 ROUTE FLOW AT 18 TO NODE 21

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 21      1      0      0      0      0      1      0      0
                             ROUTING DATA
       QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
         0.0  0.000   0.00      0      1      0      0             0
```

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

SUB-AREA RUNOFF COMPUTATION

58 LOCAL INFLOW E-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00   QRCSN= 400.00   RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	122486.
										(377.)	(281.)	(96.)	(3468.42)

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

61 SKANEATELES LAKE INFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	74.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 500.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.46	3.39	100549.
										(377.)	(291.)	(86.)	(2847.23)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

62 SKANEATELES LAKE OUTFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	0.	0

STORAGE	0.00	17323.00	34756.00	52184.00	104368.00	208736.00	243492.00
OUTFLOW	0.00	353.00	747.00	1500.00	6403.00	13313.00	17359.00

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT
0 6 2 0.000 0.000 0.000 0. 0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

65 LOCAL FLOW C-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	27.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 200.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.84 11.08 3.78 35566.
(377.)(281.)(96.)(1007.12)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

67 ROUTING TO NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

********* ********* ********* ********* *********

SUB-AREA RUNOFF COMPUTATION

68 LOCAL FLOW E-8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 400.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 122095.
(377.)(281.)(96.)(3457.35)

********* ********* ********* ********* *********

COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	2	0	0	0	0	1	0	0

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

70 BALDWINSVILLE POOL - MODIFIED PULS METHOD

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

```
                               22        1        0        0        0        0        1        0        0
                                              ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                       0.0   0.000    0.00       1       1       0       0                0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 0       0       0   0.000   0.000   0.000   3250.       0

STORAGE     3250.00   5000.00   8400.00  10000.00  11700.00  14000.00  17000.00  20000.00  24000.00  30000.00

OUTFLOW     3000.00   4000.00   6000.00   8000.00  10000.00  12000.00  14000.00  15300.00  16600.00  17000.00


          **********     **********     **********     **********     **********

                                          HYDROGRAPH ROUTING

                     71 ROUTE FLOW TO NODE 26

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                26       1       0       0       0       0       1       0       0
                                              ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                       0.0   0.000    0.00       0       1       0       0                0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 0       4       1   0.000   0.000   0.000      0.       0


          **********     **********     **********     **********     **********

                                       SUB-AREA RUNOFF COMPUTATION

                     72 INFLOW TO OTISCO LAKE C-3

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                23       0       0       0       0       0       1       0       0

                                              HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1      -1   42.70    0.00 5100.00    0.00   0.000       0       1       0

                                               PRECIP DATA
                             SPFE     PMS      R6     R12     R24     R48     R72     R96
                             0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.00    0.00    1.00    0.00    0.00    1.00     .75     .05    0.00    0.00

                                              RECESSION DATA
                                STRTQ=   90.00   QRCSN=  300.00   RTIOR= 1.60

       0                                   END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  14.86  11.46   3.39   57820.
                                                                             ( 377.)( 291.)(  86.)( 1637.51)


          **********     **********     **********     **********     **********
```

HYDROGRAPH ROUTING

73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
23	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	29300.	0

STORAGE	19600.00	21800.00	23900.00	26100.00	28300.00	30500.00	32600.00	34800.00	37000.00	39200.00
	45700.00	52300.00	58800.00	65300.00						
OUTFLOW	200.00	200.00	200.00	200.00	200.00	400.00	900.00	1600.00	2800.00	2800.00
	7040.00	18100.00	33700.00	53200.00						

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	10	4	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

75 INFLOW INTO ONONDAGA RESERVOIR C-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
24	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	68.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 300.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

```
                                                         SUM  14.86  10.60   4.26    83772.
                                                            ( 377.)( 269.)( 108.)( 2372.16)
```

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
24	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	0.	0

STORAGE	0.00	100.00	700.00	1980.00	3500.00	7940.00	18200.00	22200.00	27800.00	32500.00
	43400.00	52300.00	62200.00	72100.00						
OUTFLOW	80.00	430.00	660.00	880.00	1070.00	1420.00	1770.00	1840.00	2000.00	2000.00
	6200.00	15400.00	28400.00	44700.00						

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

79 LOCAL INFLOW C-5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	0	0	0	0	0	1	0	0

```
                          HYDROGRAPH DATA
   IHYDG   IUHG   TAREA    SNAP  TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
       1     -1  102.00    0.00 5100.00   0.00   0.000       0       1       0

                            PRECIP DATA
            SPFE    PMS     R6     R12     R24     R48     R72     R96
            0.00  21.50  33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                             LOSS DATA
  LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
      0   0.00   0.00   1.00   0.00   0.00   1.00   1.25    .06   0.00   0.00

                          RECESSION DATA
              STRTQ=  250.00   QRCSN=  500.00   RTIOR= 1.60

     0                    END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q     MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                   SUM  14.86  10.77   4.08  126945.
                                                                      ( 377.)( 274.)( 104.)( 3594.68)


        **********       **********       **********       **********       **********

                          COMBINE HYDROGRAPHS

        80 COMBINE ROUTED FLOWS, LOCAL INFLOW

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                 25      2      0      0      0      0      1       0      0


        **********       **********       **********       **********       **********

                        SUB-AREA RUNOFF COMPUTATION

        81 LOCAL FLOW C-8

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                 25      0      0      0      0      0      1       0      0

                          HYDROGRAPH DATA
   IHYDG   IUHG   TAREA    SNAP  TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
       1     -1   72.00    0.00 5100.00   0.00   0.000       0       1       0

                            PRECIP DATA
            SPFE    PMS     R6     R12     R24     R48     R72     R96
            0.00  21.50  33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                             LOSS DATA
  LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
      0   0.00   0.00   1.00   0.00   0.00   1.00   1.00    .06   0.00   0.00

                          RECESSION DATA
              STRTQ=  250.00   QRCSN=  300.00   RTIOR= 1.60

     0                    END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q     MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q
```

```
                                   SUM   14.86   10.94    3.92   91383.
                                       ( 377.)( 278.)( 100.)( 2587.68)
```

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*********          *********          *********          *********          *********
```

COMBINE HYDROGRAPHS

82 COMBINE LOCAL FLOW AT NODE 25

```
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             25       2       0       0       0       0       1       0       0
```

```
*********          *********          *********          *********          *********
```

HYDROGRAPH ROUTING

83 ROUTE FLOWS TO NODE 26

```
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             26       1       0       0       0       0       1       0       0
                                 ROUTING DATA
  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
    0.0   0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              0       0       3   0.000   0.000   0.000      0.       0
```

```
*********          *********          *********          *********          *********
```

COMBINE HYDROGRAPHS

84 COMBINE ROUTED FLOW AND FLOW AT NODE 26

```
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             26       2       0       0       0       0       1       0       0
```

```
*********          *********          *********          *********          *********
```

HYDROGRAPH ROUTING

85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)

```
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             28       1       0       0       0       0       1       0       0
                                 ROUTING DATA
  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
    0.0   0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              0       6       2   0.000   0.000   0.000      0.       0
```

```
*********          *********          *********          *********          *********
```

SUB-AREA RUNOFF COMPUTATION

86 LOCAL FLOW (E-9) AT NODE 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
27	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	37.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 150.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	46874.
										(377.)	(281.)	(96.)	(1327.32)

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HYDROGRAPH ROUTING

07 ROUTE LOCAL FLOW E-9 TO NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	1	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 28, PLAN 1, RTIO 1

OUTFLOW

19.	19.	18.	17.	17.	37.	168.	235.	280.	528.
1549.	2110.	1986.	996.	473.	259.	173.	74.	37.	28.
27.	26.	25.	24.	22.	21.	20.	20.	19.	18.
17.	16.	15.	15.	14.	13.	13.	12.	12.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2110.	2048.	1602.	734.	9368.
CMS	60.	58.	45.	21.	265.
INCHES		.51	1.61	2.22	2.36
MM		13.00	40.91	56.28	59.82
AC-FT		1015.	3177.	4370.	4645.
THOUS CU M		1253.	3919.	5390.	5730.

STATION 28, PLAN 1, RTIO 2

OUTFLOW

38.	38.	36.	35.	33.	75.	337.	470.	559.	1056.

[illegible]	4221.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	37.
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3203.	1469.	18736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.55	119.65
AC-FT		2031.	6354.	8740.	9291.
THOUS CU M		2505.	7837.	10780.	11460.

STATION 28, PLAN 1, RTIO 3

OUTFLOW

48.	47.	46.	43.	41.	93.	421.	588.	699.	1320.
3072.	5276.	4964.	2491.	1182.	647.	432.	185.	92.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	44.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	149.	145.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.89
MM		32.69	102.28	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU M		3131.	9797.	13475.	14325.

STATION 28, PLAN 1, RTIO 4

OUTFLOW

57.	56.	55.	52.	50.	112.	505.	705.	839.	1584.
4646.	6331.	5957.	2989.	1419.	777.	519.	222.	111.	85.
81.	78.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.83	6.65	7.07
MM		39.23	122.74	168.83	179.47
AC-FT		3046.	9531.	13109.	13936.
THOUS CU M		3758.	11756.	16170.	17190.

STATION 28, PLAN 1, RTIO 5

OUTFLOW

76.	75.	73.	70.	66.	149.	674.	940.	1118.	2112.
6195.	8441.	7942.	3986.	1891.	1036.	692.	296.	148.	114.
108.	103.	99.	94.	90.	86.	82.	78.	74.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	45.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1061.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12708.	17479.	18582.
THOUS CU M		5010.	15675.	21560.	22920.

STATION 28, PLAN 1, RTIO 6

OUTFLOW

95.	94.	91.	87.	83.	187.	842.	1175.	1398.	2640.
7744.	10551.	9928.	4902.	2364.	1295.	864.	370.	184.	142.
136.	129.	123.	118.	112.	107.	102.	98.	93.	89.
85.	81.	77.	74.	70.	67.	64.	61.	58.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46841.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	8.05	11.08	11.78
MM		65.39	204.57	281.38	299.12
AC-FT		5077.	15885.	21849.	23227.
THOUS CU M		6263.	19594.	26950.	28650.

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COMBINE HYDROGRAPHS

80 COMBINE HYDROGRAPHS AT 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN (C-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
29	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

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HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE 29 TO NODE 30

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

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                                   SUB-AREA RUNOFF COMPUTATION

                    91 LOCAL INFLOW D-4

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                30       0       0       0       0       0       1       0       0

                                           HYDROGRAPH DATA
                   IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                       1      -1  529.00    0.00 5100.00    0.00   0.000       0       1       0

                                             PRECIP DATA
                          SPFE     PMS      R6     R12     R24     R48     R72     R96
                          0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
               LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                   0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .06    0.00    0.00

                                           RECESSION DATA
                             STRTQ=  800.00    QRCSN= 3960.00    RTIOR= 1.60

         0                                  END-OF-PERIOD FLOW
    MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                            SUM  14.86  11.08   3.78  681577.
                                                                                ( 377.)( 281.)(  96.)(19300.11)



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                                        COMBINE HYDROGRAPHS

                    92 COMBINE LOCAL FLOW WITH ROUTED FLOW

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                30       2       0       0       0       0       1       0       0



            *********       *********       *********       *********       *********

                                        HYDROGRAPH ROUTING

                    93 ROUTE FLOWS TO NODE 31

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                31       1       0       0       0       0       1       0       0
                                              ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0   0.000    0.00       0       1       0       0               0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 0       1       0   0.000   0.000   0.000      0.       0



            *********       *********       *********       *********       *********

                                   SUB-AREA RUNOFF COMPUTATION

                    94 LOCAL FLOW D-3
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ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	144.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 320.00 QRCSN= 1000.00 RTIOR= 2.00

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	176726.
										(377.)	(281.)	(96.)	(5004.32)

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COMBINE HYDROGRAPHS

95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

96 LOCAL FLOW D-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	105.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 240.00 QRCSN= 800.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 136512.
(377.)(281.)(96.)(3865.59)

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COMBINE HYDROGRAPHS

97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

98 LOCAL FLOW D-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	280.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.04	0.00	0.00

RECESSION DATA

STRTQ= 600.00 QRCSN= 2160.00 RTIOR= 1.60

0
END-OF-PERIOD FLOW
NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 361788.
(377.)(281.)(96.)(10244.78)

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COMBINE HYDROGRAPHS

99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

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                         100 LOCAL FLOW D-5

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       0       0       0       0       0       1       0       0

                                                   HYDROGRAPH DATA
                      IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                          1      -1  269.00    0.00 5100.00    0.00   0.000       0       1       0

                                                     PRECIP DATA
                           SPFE     PMS      R6     R12     R24     R48     R72     R96
                           0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                      LOSS DATA
                   LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                       0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .05    0.00    0.00

                                                    RECESSION DATA
                                  STRTQ=  540.00   QRCSN= 2000.00    RTIOR= 1.60

                0                                END-OF-PERIOD FLOW
           MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                                   SUM  14.86  11.56   3.30   363523.
                                                                                      ( 377.)( 294.)(  84.)(10293.83)


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                                                 COMBINE HYDROGRAPHS

                         101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       2       0       0       0       0       1       0       0


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                                                 HYDROGRAPH ROUTING

                         102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       1       0       0       0       0       1       0       0
                                                    ROUTING DATA
                         QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                           0.0   0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       0   0.000   0.000   0.000 670000.       0

STORAGE    442000.00   635000.00   640000.00   650000.00   680000.00   735000.00   806000.00   845000.00        0.00        0.00
           990000.00  1150000.00  1304000.00

OUTFLOW      1000.00     1000.00     2000.00     4000.00     6000.00     8000.00    10000.00    11000.00        0.00        0.00
            27900.00    64700.00   116600.00


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                         HYDROGRAPH ROUTING

        103 ROUTE FLOWS TO NODE 32

              ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                 32       1       0       0      0      0       1       0      0
                                  ROUTING DATA
        QLOSS   CLOSS     AVG    IRES   ISAME   IOPT   IPMP           LSTR
          0.0   0.000    0.00       0       1      0      0              0

              NSTPS   NSTDL     LAG   AMSKK      X    TSK   STORA  ISPRAT
                  0       1       0   0.000  0.000  0.000     0.       0


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                       SUB-AREA RUNOFF COMPUTATION

        104 LOCAL FLOW D-6

              ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                 32       0       0       0      0      0       1       0      0

                                 HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
         1      -1   28.00    0.00 5100.00    0.00   0.000       0       1       0

                                   PRECIP DATA
             SPFE     PMS      R6     R12     R24     R48     R72     R96
             0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                    LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
         0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                 RECESSION DATA
                  STRTQ=   70.00   QRCSN=  210.00    RTIOR= 1.60

          0                      END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                   SUM  14.86  11.08   3.78   36884.
                                                                      ( 377.)( 281.)(  96.)( 1044.44)


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                          COMBINE HYDROGRAPHS

        105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32

              ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                 32       2       0       0      0      0       1       0      0


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                          HYDROGRAPH ROUTING

        106 ROUTE FLOW AT 32 TO NODE 33
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106 ROUTE FLOW AT 32 TO NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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**********          **********          **********          **********          **********
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COMBINE HYDROGRAPHS

107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

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**********          **********          **********          **********          **********
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SUB-AREA RUNOFF COMPUTATION

108 LOCAL FLOW D-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	77.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 800.00 RTIOR= 2.00

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	15.46	11.25	4.21	138583.
										(393.)	(286.)	(107.)	(3924.23)

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**********          **********          **********          **********          **********
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COMBINE HYDROGRAPHS

109 COMBINE WITH FLOW AT NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	1	1	0	0

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 1

8875.	8852.	8835.	8814.	8772.	8751.	8953.	9171.	9387.	10184.
12925.	15932.	18110.	19116.	20399.	22072.	23698.	24853.	25760.	26136.
26110.	25817.	25341.	24713.	24079.	23540.	23137.	22847.	22676.	22618.
22649.	22741.	22856.	22966.	23041.	23064.	23024.	22909.	22782.	22656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	25903.	24637.	753394.
CMS	740.	740.	734.	698.	21334.
INCHES		.05	.19	.54	1.37
MM		1.20	4.77	13.61	34.70
AC-FT		12954.	51379.	146600.	373584.
THOUS CU M		15978.	63375.	180828.	460809.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 2

9194.	9172.	9183.	9204.	9200.	9256.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39189.	40382.	40638.
40357.	39735.	38908.	37933.	37068.	36447.	36090.	35900.	35864.	35971.
36207.	36550.	36973.	37448.	37939.	38410.	38828.	39161.	39402.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40638.	40510.	40210.	38315.	1155580.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.07	.29	.83	2.10
MM		1.87	7.41	21.17	53.22
AC-FT		20088.	79755.	227993.	573015.
THOUS CU M		24778.	98376.	281225.	706803.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 3

9353.	9332.	9357.	9399.	9414.	9508.	10191.	10904.	11615.	13797.
20060.	28325.	33482.	35435.	37701.	40731.	43514.	45298.	46650.	46955.
46699.	46065.	45207.	44180.	43287.	42689.	42403.	42299.	42352.	42545.
42850.	43269.	43752.	44276.	44810.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46955.	46827.	46496.	44555.	1340699.
CMS	1330.	1326.	1317.	1262.	37964.
INCHES		.08	.34	.97	2.43
MM		2.16	8.57	24.62	61.74
AC-FT		23220.	92224.	265123.	664810.
THOUS CU M		28641.	113757.	327024.	820031.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 4

9513.	9492.	9531.	9595.	9628.	9761.	10604.	11483.	12358.	15018.
23482.	32353.	38377.	40457.	42871.	46182.	49268.	51253.	52815.	53242.
53063.	52450.	51593.	50531.	49630.	49076.	48800.	48877.	49031.	49317.
49711.	50109.	50725.	51293.	51059.	52391.	52852.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.10	.39	1.12	2.77
MM		2.47	9.79	28.34	70.34
AC-FT		26552.	105391.	305106.	757435.
THOUS CU M		32751.	129998.	376342.	934282.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 5

9831.	9813.	9879.	9985.	10058.	10267.	11430.	12640.	13863.	17443.
28680.	40298.	47974.	50278.	52989.	56966.	60770.	63310.	65480.	66295.
66360.	65848.	64971.	63808.	62825.	62263.	62134.	62211.	62450.	62820.
63301.	63868.	64498.	65164.	65834.	66468.	67021.	67451.	67758.	67951.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67951.	67854.	67360.	65143.	1904358.
CMS	1924.	1921.	1907.	1845.	53925.
INCHES		.12	.49	1.42	3.45
MM		3.12	12.41	36.00	87.70
AC-FT		33647.	133606.	387626.	944310.
THOUS CU M		41503.	164801.	478129.	1164789.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 6

10150.	10133.	10228.	10376.	10487.	10774.	12257.	13819.	15410.	19894.
33860.	48171.	57454.	59943.	62941.	67609.	72185.	75346.	78178.	79405.
79709.	79278.	78374.	77086.	75992.	75392.	75293.	75420.	75715.	76152.
76710.	77368.	78102.	78885.	79603.	80444.	81114.	81640.	82016.	82255.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	82255.	82136.	81530.	78889.	2279043.
CMS	2329.	2326.	2309.	2234.	64535.
INCHES		.15	.59	1.72	4.13
MM		3.78	15.02	43.60	104.95
AC-FT		40728.	161712.	469421.	1130104.
THOUS CU M		50238.	199469.	579023.	1393963.

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HYDROGRAPH ROUTING

110 ROUTE FLOW AT 28 TO NODE 33

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
33	1	0	0	0	1	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 33, PLAN 1, RTIO 1

OUTFLOW

8875.	8860.	8854.	8834.	8807.	8779.	8825.	8958.	9171.	9581.
10832.	13014.	15656.	17719.	19200.	20529.	22056.	23541.	24770.	25583.
26002.	26021.	25756.	25291.	24711.	24111.	23505.	23175.	22887.	22713.
22640.	22669.	22749.	22854.	22954.	23024.	23043.	22999.	22905.	22824.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26021.	26012.	25804.	24585.	739529.
CMS	737.	737.	731.	696.	20941.
INCHES		.05	.19	.53	1.34
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
MM		[illegible]	[illegible]	[illegible]	[illegible]
AC-FT		12898.	51181.	146290.	366709.
THOUS CU M		15910.	63131.	180446.	452328.

STATION 33, PLAN 1, RTIO 2

OUTFLOW

9194.	9187.	9183.	9186.	9196.	9220.	9411.	9787.	10326.	11260.
13097.	18350.	23665.	27675.	30372.	32560.	34989.	37270.	39042.	40070.
40459.	40244.	39667.	38859.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36576.	36990.	37453.	37932.	38392.	38799.	39130.	39322.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40459.	40351.	40032.	38240.	1125333.
CMS	1146.	1143.	1134.	1083.	31866.
INCHES		.07	.29	.83	2.04
MM		1.86	7.37	21.13	51.82
AC-FT		20009.	79402.	227544.	558016.
THOUS CU M		24681.	97940.	280671.	688303.

STATION 33, PLAN 1, RTIO 3

OUTFLOW

9353.	9346.	9348.	9363.	9390.	9441.	9704.	10201.	10903.	12106.
15424.	20994.	27556.	32414.	35539.	37956.	40649.	43181.	45154.	46301.
46768.	46573.	45990.	45151.	44225.	43385.	42793.	42463.	42351.	42398.
42585.	42891.	43293.	43766.	44279.	44802.	45298.	45736.	46090.	46295.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46768.	46670.	46304.	44495.	1303631.
CMS	1324.	1322.	1311.	1260.	36915.
INCHES		.08	.34	.97	2.36
MM		2.15	8.53	24.59	60.03
AC-FT		23142.	91842.	264766.	646429.
THOUS CU M		28546.	113285.	326583.	797358.

STATION 33, PLAN 1, RTIO 4

OUTFLOW

9513.	9506.	9512.	9539.	9585.	9661.	9998.	10616.	11482.	12953.
16953.	23618.	31404.	37062.	40568.	43170.	46107.	48901.	51112.	52437.
53040.	52921.	52372.	51520.	50585.	49745.	49195.	48944.	48929.	49075.
49353.	49739.	50200.	50736.	51292.	51847.	52367.	52818.	53176.	53381.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53381.	53279.	52744.	50892.	1483502.
CMS	1512.	1509.	1494.	1441.	42008.
INCHES		.10	.38	1.11	2.69
MM		2.45	9.72	28.12	68.32
AC-FT		26419.	104616.	302829.	735621.
THOUS CU M		32588.	129042.	373533.	907375.

STATION 33, PLAN 1, RTIO 5

OUTFLOW

9831.	9825.	9841.	9892.	9974.	10103.	10585.	11446.	12644.	14648.
19995.	28007.	38984.	46183.	50413.	53411.	56900.	60349.	63186.	65028.
66045.	66168.	65726.	64876.	63860.	62965.	62407.	62203.	62265.	62494.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

62857.	63330.	63889.	64510.	65183.	65822.	66441.	66980.	67410.	67656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1846386.
CMS	1916.	1912.	1894.	1831.	52284.
INCHES		.12	.49	1.41	3.35
MM		3.11	12.32	35.74	85.03
AC-FT		33487.	132679.	384838.	915563.
THOUS CU M		41306.	163657.	474691.	1129331.

STATION 33, PLAN 1, RTIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23055.	33975.	46495.	55109.	60113.	63498.	67578.	71713.	75236.	77643.
79097.	79464.	79120.	78246.	77151.	76156.	75559.	75368.	75476.	75762.
76192.	76743.	77393.	78118.	78890.	79671.	80414.	81066.	81590.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81891.	81740.	80963.	78329.	2207121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.70	4.00
MM		3.76	14.91	43.29	101.64
AC-FT		40532.	160587.	466008.	1094440.
THOUS CU M		49996.	198081.	574912.	1349972.

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .40	RATIO 3 .50	RATIO 4 .60	RATIO 5 .80	RATIO 6 1.00
				RATIOS APPLIED TO FLOWS					
HYDROGRAPH AT	1	100.00	1	78.	157.	196.	235.	314.	392.
		(259.00)	(	2.22)(	4.44)(	5.55)(	6.66)(	8.88)(	11.10)(
ROUTED TO	2	100.00	1	78.	156.	195.	234.	311.	389.
		(259.00)	(	2.20)(	4.41)(	5.51)(	6.61)(	8.82)(	11.02)(
HYDROGRAPH AT	2	147.00	1	5716.	11432.	14291.	17149.	22865.	28581.
		(380.73)	(	161.86)(	323.73)(	404.66)(	485.59)(	647.46)(	809.32)(
2 COMBINED	2	247.00	1	5793.	11585.	14481.	17378.	23170.	28963.
		(639.73)	(	164.03)(	328.05)(	410.07)(	492.08)(	656.11)(	820.13)(
ROUTED TO	6	247.00	1	3651.	7301.	9127.	10952.	14602.	18253.
		(639.73)	(	103.37)(	206.75)(	258.43)(	310.12)(	413.50)(	516.87)(
HYDROGRAPH AT	6	118.00	1	2735.	5469.	6837.	8204.	10939.	13674.
		(305.62)	(	77.44)(	154.88)(	193.60)(	232.32)(	309.75)(	387.19)(
2 COMBINED	6	365.00	1	6222.	12444.	15555.	18666.	24888.	31110.
		(945.35)	(	176.19)(	352.38)(	440.47)(	528.57)(	704.75)(	880.94)(

HYDROGRAPH AT	3	51.00	1	3559.	7119.	8898.	10678.	14237.	17797.
		(132.09)	(	100.79)(	201.58)(	251.97)(	302.37)(	403.16)(	503.95)(
ROUTED TO	6	51.00	1	1974.	3948.	4934.	5921.	7895.	9869.
		(132.09)	(	55.89)(	111.78)(	139.73)(	167.67)(	223.56)(	279.46)(
2 COMBINED	6	416.00	1	6557.	13115.	16393.	19672.	26229.	32787.
		(1077.44)	(	185.68)(	371.36)(	464.21)(	557.05)(	742.73)(	928.41)(
HYDROGRAPH AT	4	184.00	1	14208.	28416.	35520.	42624.	56832.	71040.
		(476.56)	(	402.32)(	804.65)(	1005.81)(	1206.97)(	1609.30)(	2011.62)(
ROUTED TO	4	184.00	1	868.	1985.	2666.	5119.	11584.	18145.
		(476.56)	(	24.58)(	56.20)(	75.48)(	144.96)(	328.03)(	513.80)(
ROUTED TO	5	184.00	1	828.	1833.	2447.	3475.	6907.	10624.
		(476.56)	(	23.45)(	51.89)(	69.29)(	98.40)(	195.59)(	300.84)(
HYDROGRAPH AT	5	102.00	1	2638.	5276.	6595.	7914.	10552.	13190.
		(264.18)	(	74.70)(	149.40)(	186.75)(	224.11)(	298.81)(	373.51)(
2 COMBINED	5	286.00	1	3060.	6020.	7544.	9246.	13808.	18651.
		(740.74)	(	86.66)(	170.47)(	213.63)(	261.82)(	390.99)(	528.15)(
ROUTED TO	56	286.00	1	2577.	5093.	6405.	7999.	12497.	17263.
		(740.74)	(	72.97)(	144.22)(	181.38)(	226.50)(	353.88)(	488.83)(
HYDROGRAPH AT	56	155.00	1	4849.	9698.	12123.	14548.	19397.	24246.
		(401.45)	(	137.32)(	274.63)(	343.29)(	411.95)(	549.26)(	686.58)(
2 COMBINED	56	441.00	1	7157.	14184.	17730.	21420.	29529.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
ROUTED TO	6	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
2 COMBINED	6	857.00	1	13498.	26867.	33585.	40445.	54894.	69626.
		(2219.62)	(	382.23)(	760.80)(	951.01)(	1145.28)(	1554.43)(	1971.59)(
ROUTED TO	8	857.00	1	11700.	23294.	29131.	35158.	48028.	61131.
		(2219.62)	(	331.29)(	659.62)(	824.91)(	995.56)(	1360.00)(	1731.02)(
HYDROGRAPH AT	7	89.00	1	3132.	6264.	7830.	9396.	12528.	15660.
		(230.51)	(	88.69)(	177.38)(	221.72)(	266.07)(	354.76)(	443.44)(
ROUTED TO	8	89.00	1	2937.	5873.	7342.	8810.	11746.	14683.
		(230.51)	(	83.16)(	166.31)(	207.89)(	249.47)(	332.62)(	415.78)(
2 COMBINED	8	946.00	1	12296.	24459.	30571.	36830.	50268.	63931.
		(2450.13)	(	348.18)(	692.59)(	865.68)(	1043.14)(	1423.43)(	1810.31)(
ROUTED TO	10	946.00	1	11829.	23528.	29410.	35496.	48475.	61680.
		(2450.13)	(	334.95)(	666.25)(	832.79)(	1005.12)(	1372.67)(	1746.58)(
HYDROGRAPH AT	9	18.00	1	608.	1217.	1521.	1825.	2433.	3042.
		(46.62)	(	17.23)(	34.45)(	43.07)(	51.68)(	68.91)(	86.13)(
ROUTED TO	10	18.00	1	601.	1201.	1502.	1802.	2403.	3003.
		(46.62)	(	17.01)(	34.02)(	42.52)(	51.03)(	68.04)(	85.05)(
2 COMBINED	10	964.00	1	11922.	23714.	29642.	35718.	48772.	62051.
		(2496.75)	(	337.58)(	671.51)(	839.37)(	1011.43)(	1381.08)(	1757.09)(
ROUTED TO	15	964.00	1	11544.	22961.	28702.	34595.	47264.	60158.
		(2496.75)	(	326.88)(	650.18)(	812.76)(	979.61)(	1338.43)(	1703.49)(

HYDROGRAPH AT	11	183.00	1	20366.	40732.	50915.	61098.	81464.	101830.
		(473.97)	(	576.70)(	1153.40)(	1441.75)(	1730.10)(	2306.80)(	2883.49)(
ROUTED TO	11	183.00	1	560.	839.	1036.	1282.	1845.	2406.
		(473.97)	(	15.85)(	23.74)(	29.34)(	36.30)(	52.23)(	68.14)(
ROUTED TO	12	183.00	1	559.	831.	1026.	1263.	1817.	2371.
		(473.97)	(	15.83)(	23.52)(	29.05)(	35.78)(	51.46)(	67.13)(
HYDROGRAPH AT	12	524.00	1	41859.	83718.	104647.	125577.	167436.	209295.
		(1357.15)	(	1185.31)(	2370.62)(	2963.28)(	3555.94)(	4741.25)(	5926.56)(
2 COMBINED	12	707.00	1	42350.	84221.	105156.	126101.	167996.	209892.
		(1831.12)	(	1199.22)(	2384.88)(	2977.69)(	3570.79)(	4757.11)(	5943.48)(
ROUTED TO	12	707.00	1	700.	2514.	3000.	4713.	12318.	19824.
		(1831.12)	(	19.82)(	71.20)(	84.95)(	133.47)(	348.82)(	561.34)(
ROUTED TO	13	707.00	1	700.	2500.	3000.	4701.	12312.	19707.
		(1831.12)	(	19.82)(	71.01)(	84.95)(	133.12)(	348.65)(	558.05)(
HYDROGRAPH AT	13	39.00	1	1958.	3915.	4894.	5873.	7831.	9789.
		(101.01)	(	55.44)(	110.87)(	138.59)(	166.31)(	221.75)(	277.18)(
2 COMBINED	13	746.00	1	2658.	4615.	5657.	7109.	13847.	21998.
		(1932.13)	(	75.26)(	130.69)(	160.19)(	201.31)(	392.09)(	622.90)(
ROUTED TO	14	746.00	1	1917.	3419.	4912.	5982.	13164.	20914.
		(1932.13)	(	54.28)(	96.83)(	139.09)(	169.39)(	372.76)(	592.22)(
HYDROGRAPH AT	14	36.00	1	1927.	3854.	4817.	5780.	7707.	9634.
		(93.24)	(	54.56)(	109.12)(	136.40)(	163.68)(	218.24)(	272.80)(
2 COMBINED	14	782.00	1	3364.	6028.	7370.	8781.	13470.	21512.
		(2025.37)	(	95.26)(	170.69)(	208.71)(	248.66)(	381.42)(	609.16)(
HYDROGRAPH AT	14	782.00	1	43279.	86557.	108197.	129836.	173114.	216393.
		(2025.37)	(	1225.51)(	2451.03)(	3063.78)(	3676.54)(	4902.05)(	6127.57)(
2 COMBINED	14	1564.00	1	46193.	91686.	114432.	137179.	182681.	228285.
		(4050.74)	(	1308.04)(	2596.25)(	3240.36)(	3884.47)(	5172.96)(	6464.31)(
ROUTED TO	14	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
ROUTED TO	15	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
2 COMBINED	15	2528.00	1	14944.	31661.	37402.	43295.	55966.	68858.
		(6547.49)	(	423.15)(	896.54)(	1059.12)(	1225.97)(	1584.78)(	1949.84)(
ROUTED TO	18	2528.00	1	14139.	30071.	35426.	40960.	52754.	64739.
		(6547.49)	(	400.37)(	851.52)(	1003.14)(	1159.86)(	1493.83)(	1833.21)(
HYDROGRAPH AT	16	191.00	1	8770.	17539.	21924.	26309.	35079.	43849.
		(494.69)	(	248.33)(	496.66)(	620.83)(	744.99)(	993.32)(	1241.65)(
ROUTED TO	18	191.00	1	8307.	16613.	20766.	24920.	33226.	41533.
		(494.69)	(	235.22)(	470.43)(	588.04)(	705.65)(	940.86)(	1176.08)(
2 COMBINED	18	2719.00	1	14213.	30219.	35610.	41181.	53049.	65108.
		(7042.18)	(	402.46)(	855.70)(	1008.36)(	1166.12)(	1502.18)(	1843.65)(
HYDROGRAPH AT	17	201.00	1	11920.	23840.	29801.	35761.	47681.	59601.
		(520.59)	(	337.54)(	675.09)(	843.86)(	1012.63)(	1350.17)(	1687.71)(

ROUTED TO	17	201.00	1	2523.	3400.	6860.	10899.	19286.	27153.
		(520.59)	(	71.45)(	96.28)(	194.25)(	308.61)(	546.11)(	768.87)(
ROUTED TO	18	201.00	1	2440.	3400.	5197.	8317.	14130.	20256.
		(520.59)	(	69.09)(	96.28)(	147.16)(	235.52)(	400.12)(	573.58)(
2 COMBINED	18	2920.00	1	16048.	33461.	39010.	44581.	56449.	68523.
		(7562.77)	(	454.42)(	947.51)(	1104.64)(	1262.40)(	1598.46)(	1940.35)(
HYDROGRAPH AT	18	19.00	1	708.	1416.	1770.	2124.	2831.	3539.
		(49.21)	(	20.04)(	40.09)(	50.11)(	60.13)(	80.18)(	100.22)(
2 COMBINED	18	2939.00	1	16082.	33529.	39095.	44683.	56585.	68692.
		(7611.98)	(	455.38)(	949.43)(	1107.04)(	1265.28)(	1602.30)(	1945.15)(
ROUTED TO	21	2939.00	1	15651.	32572.	37923.	43327.	54904.	66706.
		(7611.98)	(	443.19)(	922.33)(	1073.86)(	1226.88)(	1554.71)(	1888.91)(
HYDROGRAPH AT	19	98.00	1	5333.	10666.	13333.	15999.	21333.	26666.
		(253.82)	(	151.02)(	302.04)(	377.55)(	453.06)(	604.07)(	755.09)(
ROUTED TO	21	98.00	1	3197.	6395.	7993.	9592.	12789.	15986.
		(253.82)	(	90.54)(	181.07)(	226.34)(	271.61)(	362.15)(	452.68)(
2 COMBINED	21	3037.00	1	15710.	32683.	38062.	43494.	55127.	66985.
		(7865.79)	(	444.84)(	925.49)(	1077.80)(	1231.62)(	1561.02)(	1896.79)(
HYDROGRAPH AT	20	74.00	1	9096.	18191.	22739.	27287.	36383.	45478.
		(191.66)	(	257.56)(	515.12)(	643.90)(	772.68)(	1030.24)(	1287.80)(
ROUTED TO	20	74.00	1	179.	358.	456.	555.	757.	1124.
		(191.66)	(	5.06)(	10.13)(	12.93)(	15.72)(	21.44)(	31.83)(
ROUTED TO	21	74.00	1	177.	354.	451.	549.	745.	1098.
		(191.66)	(	5.01)(	10.02)(	12.78)(	15.54)(	21.08)(	31.08)(
2 COMBINED	21	3111.00	1	15877.	33016.	38484.	44007.	55821.	67932.
		(8057.45)	(	449.59)(	934.92)(	1089.74)(	1246.13)(	1580.66)(	1923.62)(
HYDROGRAPH AT	21	27.00	1	1584.	3168.	3959.	4751.	6335.	7919.
		(69.93)	(	44.85)(	89.69)(	112.12)(	134.54)(	179.39)(	224.24)(
2 COMBINED	21	3138.00	1	15903.	33065.	38545.	44079.	55918.	68053.
		(8127.38)	(	450.31)(	936.29)(	1091.46)(	1248.19)(	1583.41)(	1927.06)(
ROUTED TO	22	3138.00	1	15786.	32815.	38247.	43745.	55465.	67485.
		(8127.38)	(	447.01)(	929.21)(	1083.04)(	1238.71)(	1570.59)(	1910.96)(
HYDROGRAPH AT	22	98.00	1	7764.	15527.	19409.	23291.	31055.	38819.
		(253.82)	(	219.84)(	439.69)(	549.61)(	659.53)(	879.38)(	1099.22)(
2 COMBINED	22	3236.00	1	15827.	32898.	38351.	43869.	55630.	67692.
		(8381.20)	(	448.18)(	931.55)(	1085.97)(	1242.23)(	1575.27)(	1916.82)(
ROUTED TO	22	3236.00	1	15035.	27531.	32506.	37545.	48117.	58777.
		(8381.20)	(	425.76)(	779.59)(	920.48)(	1063.17)(	1362.53)(	1664.38)(
ROUTED TO	26	3236.00	1	14971.	27442.	32406.	37409.	47930.	58540.
		(8381.20)	(	423.92)(	777.07)(	917.62)(	1059.30)(	1357.23)(	1657.66)(
HYDROGRAPH AT	23	42.70	1	4418.	8835.	11044.	13253.	17671.	22089.
		(110.59)	(	125.10)(	250.19)(	312.74)(	375.29)(	500.38)(	625.48)(
ROUTED TO	23	42.70	1	748.	1736.	2000.	2218.	4376.	6539.
		(110.59)	(	21.18)(	49.17)(	56.63)(	62.81)(	123.91)(	185.17)(

ROUTED TO	25	42.70	1	584.	1319.	1647.	1911.	2720.	3610.
		(110.59)	(	16.59)(	37.35)(	47.21)(	54.13)(	77.03)(	102.22)(
HYDROGRAPH AT	24	68.00	1	5101.	10202.	12753.	15304.	20405.	25506.
		(176.12)	(	144.45)(	288.90)(	361.13)(	433.35)(	577.80)(	722.25)(
ROUTED TO	24	68.00	1	1160.	1518.	1628.	1743.	1909.	2000.
		(176.12)	(	32.85)(	42.98)(	46.11)(	49.35)(	54.05)(	56.63)(
ROUTED TO	25	68.00	1	1085.	1481.	1594.	1707.	1874.	2000.
		(176.12)	(	30.72)(	41.95)(	45.13)(	48.33)(	53.05)(	56.63)(
2 COMBINED	25	110.70	1	1656.	2800.	3261.	3618.	4594.	5610.
		(286.71)	(	46.91)(	79.29)(	92.33)(	102.46)(	130.09)(	158.85)(
HYDROGRAPH AT	25	102.00	1	5570.	11141.	13926.	16711.	22282.	27852.
		(264.18)	(	157.74)(	315.48)(	394.34)(	473.21)(	630.95)(	788.69)(
2 COMBINED	25	212.70	1	6264.	12169.	15086.	17971.	23907.	29854.
		(550.89)	(	177.37)(	344.58)(	427.20)(	508.89)(	676.97)(	845.38)(
HYDROGRAPH AT	25	72.00	1	3355.	6709.	8386.	10064.	13418.	16773.
		(186.48)	(	94.99)(	189.98)(	237.48)(	284.97)(	379.97)(	474.96)(
2 COMBINED	25	284.70	1	9262.	18165.	22581.	26965.	35899.	44844.
		(737.37)	(	262.26)(	514.37)(	639.43)(	763.56)(	1016.54)(	1269.85)(
ROUTED TO	26	284.70	1	5545.	10654.	13130.	15563.	20730.	25914.
		(737.37)	(	157.03)(	301.69)(	372.02)(	440.69)(	587.02)(	733.81)(
2 COMBINED	26	3520.70	1	17460.	28827.	34158.	39533.	50532.	61524.
		(9118.57)	(	494.42)(	816.30)(	967.24)(	1119.46)(	1430.91)(	1742.17)(
ROUTED TO	28	3520.70	1	16731.	28565.	33868.	39258.	50202.	61123.
		(9118.57)	(	473.76)(	808.86)(	959.02)(	1111.67)(	1421.55)(	1730.82)(
HYDROGRAPH AT	27	37.00	1	3278.	6556.	8195.	9834.	13112.	16390.
		(95.83)	(	92.82)(	185.64)(	232.06)(	278.47)(	371.29)(	464.11)(
ROUTED TO	28	37.00	1	2110.	4221.	5276.	6331.	8441.	10551.
		(95.83)	(	59.76)(	119.51)(	149.39)(	179.27)(	239.03)(	298.78)(
2 COMBINED	28	3557.70	1	16758.	28587.	33896.	39292.	50247.	61180.
		(9214.40)	(	474.52)(	809.50)(	959.82)(	1112.62)(	1422.83)(	1732.42)(
HYDROGRAPH AT	29	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
ROUTED TO	30	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
HYDROGRAPH AT	30	529.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1370.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
2 COMBINED	30	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
ROUTED TO	31	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
HYDROGRAPH AT	31	144.00	1	4722.	9444.	11804.	14165.	18887.	23609.
		(372.96)	(	133.71)(	267.41)(	334.27)(	401.12)(	534.83)(	668.53)(
2 COMBINED	31	773.00	1	28027.	56054.	70067.	84081.	112108.	140135.
		(2002.06)	(	793.63)(	1587.27)(	1984.09)(	2380.90)(	3174.54)(	3968.17)(

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HYDROGRAPH AT     31    105.00      1     5045.    10089.    12611.    15134.    20178.    25223.
                  (   271.95)       (  142.85)(  285.69)(  357.11)(  428.54)(  571.38)(  714.23)(

 2 COMBINED       31    878.00      1    32185.    64370.    80462.    96555.   128740.   160925.
                  (  2274.01)       (  911.38)( 1822.75)( 2278.44)( 2734.13)( 3645.50)( 4556.88)(

HYDROGRAPH AT     31    288.00      1     8352.    16705.    20881.    25057.    33410.    41762.
                  (   745.92)       (  236.51)(  473.03)(  591.28)(  709.54)(  946.06)( 1182.57)(

 2 COMBINED       31   1166.00      1    36521.    73041.    91301.   109562.   146082.   182603.
                  (  3019.93)       ( 1034.15)( 2068.29)( 2585.36)( 3102.44)( 4136.58)( 5170.73)(

HYDROGRAPH AT     31    269.00      1    19077.    38153.    47691.    57230.    76306.    95383.
                  (   696.71)       (  540.19)( 1080.30)( 1350.47)( 1620.57)( 2160.75)( 2700.94)(

 2 COMBINED       31   1435.00      1    42495.    84990.   106238.   127485.   169980.   212476.
                  (  3716.63)       ( 1203.33)( 2406.65)( 3008.32)( 3609.98)( 4813.31)( 6016.64)(

ROUTED TO         31   1435.00      1     8666.    12305.    14086.    15877.    19464.    23053.
                  (  3716.63)       (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

ROUTED TO         32   1435.00      1     8666.    12305.    14086.    15877.    19464.    23053.
                  (  3716.63)       (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

HYDROGRAPH AT     32     28.00      1     1215.     2430.     3038.     3645.     4860.     6075.
                  (    72.52)       (   34.41)(   68.81)(   86.02)(  103.22)(  137.62)(  172.03)(

 2 COMBINED       32   1463.00      1     8804.    12502.    14309.    16118.    19761.    23409.
                  (  3789.15)       (  249.30)(  354.01)(  405.18)(  456.41)(  559.58)(  662.86)(

ROUTED TO         28   1463.00      1     8756.    12431.    14229.    16032.    19659.    23289.
                  (  3789.15)       (  247.95)(  352.02)(  402.92)(  453.98)(  556.69)(  659.47)(

 2 COMBINED       28   5020.70      1    25503.    39439.    46398.    53447.    67711.    81954.
                  ( 13003.55)       (  722.17)( 1116.79)( 1313.85)( 1513.45)( 1917.35)( 2320.69)(

HYDROGRAPH AT     28    110.00      1     3626.     7251.     9064.    10877.    14503.    18128.
                  (   284.90)       (  102.67)(  205.34)(  256.67)(  308.01)(  410.67)(  513.34)(

 2 COMBINED       28   5130.70      1    26136.    40638.    46955.    53627.    67951.    82255.
                  ( 13288.45)       (  740.08)( 1150.75)( 1329.62)( 1518.56)( 1924.16)( 2329.20)(

ROUTED TO         33   5130.70      1    26021.    40459.    46768.    53381.    67656.    81891.
                  ( 13288.45)       (  736.83)( 1145.67)( 1324.32)( 1511.58)( 1915.79)( 2318.89)(

1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
 **********************************
0
TERMINAL   325 TIME OUT.


CON= 3:24 NRU=     7.366


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Table I-1: Physical Characteristics of Lakes in the Basin

Name	Regulating Agency	Drainage Area (sq.mi.)	Surface Area (sq.mi.)	Shoreline (miles)	Principal Regulation Purpose
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS,WQ,FC,R
Keuka Lake	Village of Penn Yan	179	17.43	19	WS,SQ,Rec.
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS,Nav.,P,I Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., I FC
Owasco Lake	City of Auburn	206	10.25	25	WS,WQ,FC,R
Skaneateles Lake	City of Syracuse	74	13.8	33	WS,SQ,FC,R
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS,SQ,FC, I
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav.,FC, R

WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

C-16

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 7-31-79

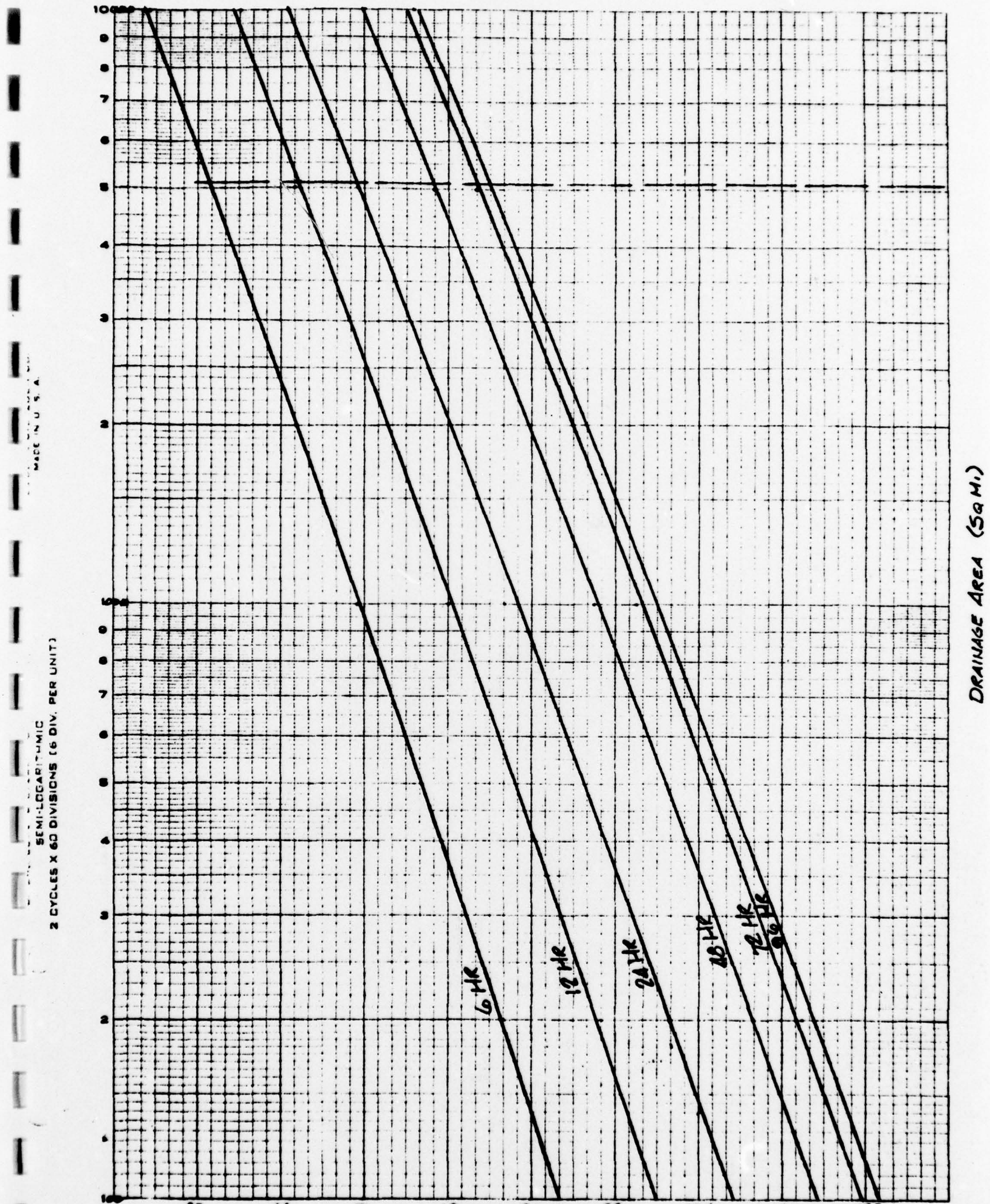
SUBJECT: OSWEGO RIVER BASIN — PROJECT NO. 2305

DEPTH - AREA - DURATION RELATIONSHIP * — DRAWN BY: JPG

AREA	DURATION	DEPTH	% INDEX
200 SQ MI	6 HR	16.0	76
	12 HR	19.0	90
	24 HR	21.0	100 ← PMF INDEX RAINFALL
	48 HR	23.5	112
200 SQ MI	72 HR	25.0	119
1000 SQ MI	6 HR	11.6	55
	12 HR	14.3	68
	24 HR	16.0	76
	48 HR	18.8	89
1000 SQ MI	72 HR	20.0	95
5000 SQ MI	6 HR	7.1	34
	12 HR	9.6	46
	24 HR	11.6	55
	48 HR	13.9	66
5000 SQ MI	72 HR	15.2	72
10000 SQ MI	6 HR	5.3	25
	12 HR	7.9	38
	24 HR	9.5	45
	48 HR	11.8	56
10000 SQ MI	72 HR	13.3	63

* FROM HYDROMETEOROLOGICAL REPORT Nº 51
SEPT 1976

PMF	DURATION	% INDEX
	6 HR	33
	12 HR	47
	24 HR	55
	48 HR	65
	72 HR	72
	96 HR	74



SEMI-LOGARITHMIC
2 CYCLES X 60 DIVISIONS (6 DIV. PER UNIT)
MADE IN U.S.A.
6 HR
12 HR
24 HR
48 HR
72 HR
96 HR
32
44
56
68
80
92
104
116
128
% OF INDEX RAINFALL
DRAINAGE AREA (SQ MI)

PROJECT NAME New York State Dam Inspection DATE [illegible]

SUBJECT [illegible] Dam - Lock No 7 PROJECT NO [illegible]

Stage - Discharge Relationship DRAWN BY [illegible]

Free Weir Flow - Side Channel Spillway (Weir Side)

Spillway = 280' Top of Dam = 268.5 B.C. Datum

Cd = 4.03 287.5 USGS Datum

Hd = 8.00' (assumed no piers)

Elev (msl)	He	He/Hd	C/Cd	C	$Q = CLHe^{1.5}$	Gross
267.5	0	0	0	0	0	0
270.0	2.5	.312	.830	3.34	3300	10060
272.5	5.0	.625	.925	3.73	10465	29925
275.0	7.5	.938	.980	3.95	20283	55329
277.5	10.0	1.250	1.030	4.15	32810	84710
280.0	12.5	1.560	1.050	4.23	46786	122135
282.5	15.0	1.875	1.050	4.23	61435	160536
285.0	17.5	2.188	1.050	4.23	77417	
287.5	20.0	2.50	1.050	4.23	94586	
290.0	22.5	2.813	1.050	4.23	112344	

Submergence

Elev (msl)	h	d	Qsub	He	Hd	hd/He	Ratio	% Reduction
267.5	0	14	40330	6.0	6.0	1.0	3.35	0
270.0	2.5	16.5	54790	7.0	4.5	.643	3.00	.5%
272.5	5.0	19.0	71638	8.8	3.8	.432	2.59	2.0%
275.0	7.5	21.5	88575	10.5	3.0	.286	2.33	4.0%

Neglect Submergence

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME New York State Dam Inspection DATE 7.13.79

SUBJECT Curved Dam - Lock No 7 PROJECT NO. 2305

Stage - Discharge Relationship DRAWN BY JPG/HFD

Free Weir Flow - Side Channel Spillway (West Side)

Spillway = 250' Top of Dam = 268.5 B.C. Datum

C_d = 4.03 267.5 USGS Datum

H_d = 8.00' (assumed - no plans)

Elev (USGS)	He	He/Hd	C/Cd	C	$Q = C\,l\,He^{1.5}$	Qtotal
267.5	0	0	0	0	0	0
270.0	2.5	.312	.830	3.34	3300	10050
272.5	5.0	.625	.925	3.73	10425	29525
275.0	7.5	.938	.980	3.95	20282	55322
277.5	10.0	1.250	1.030	4.15	32810	86710
280.0	12.5	1.560	1.050	4.23	46735	122135
282.5	15.0	1.875	1.050	4.23	61435	160535
285.0	17.5	2.188	1.050	4.23	77417	
287.5	20.0	2.50	1.050	4.23	92585	
290.0	22.5	2.813	1.050	4.23	112864	

Submergence

Elev (USGS)	h	d	Qoster	He	hd	hd/He	(hd+d)/He	% Reduction
267.5	0	14	40380	6.0	6.0	1.0	3.33	0
270.0	2.5	16.5	54750	7.0	4.5	.643	3.00	.5%
272.5	5.0	19.0	71638	8.8	3.8	.432	2.59	2.0%
275.0	7.5	21.5	88525	10.5	3.0	.286	2.33	4.0%

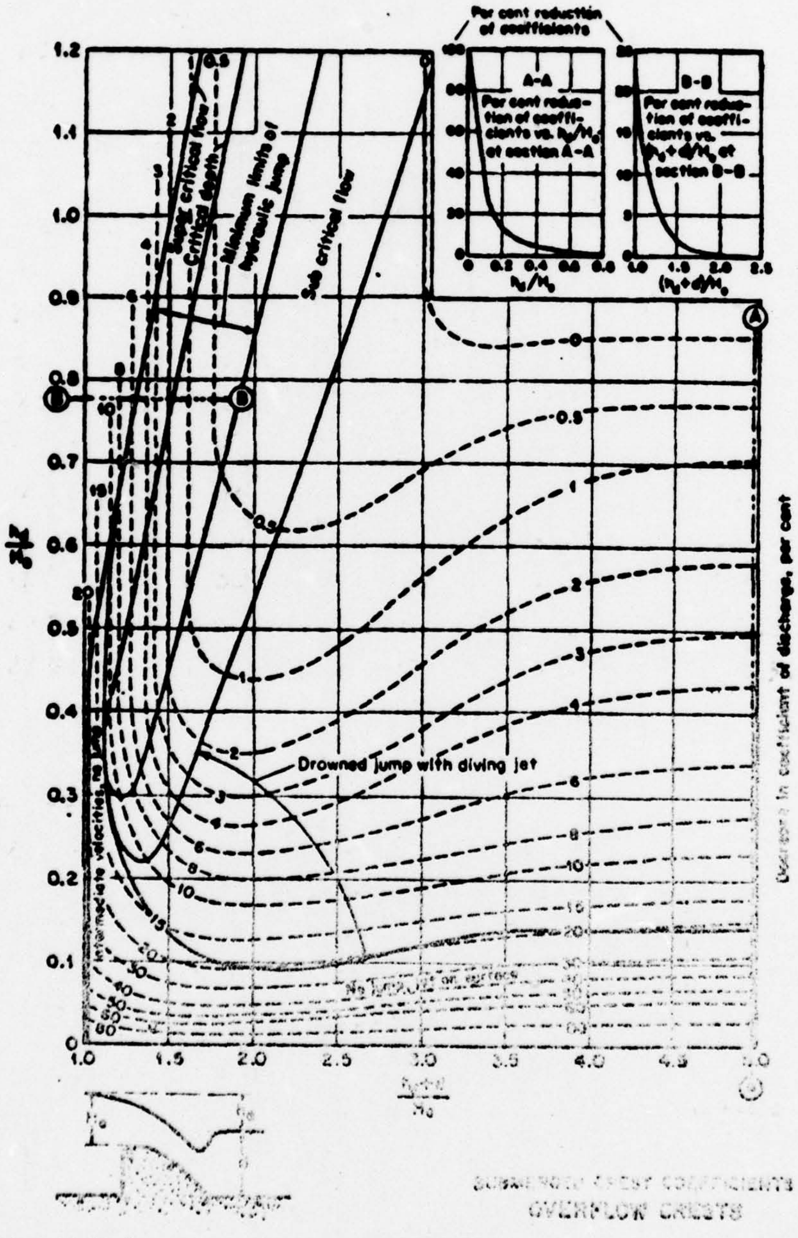
Neglect Submergence

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 DESIGN BRIEF

PROJECT NAME New York State Dam Inspection DATE 6.19.79

SUBJECT High Dam - Lock № 7 PROJECT NO. 2305

Stage - Discharge Relationship DRAWN BY JPG & N-D



SUBMERGED CREST COEFFICIENTS
OVERFLOW CRESTS

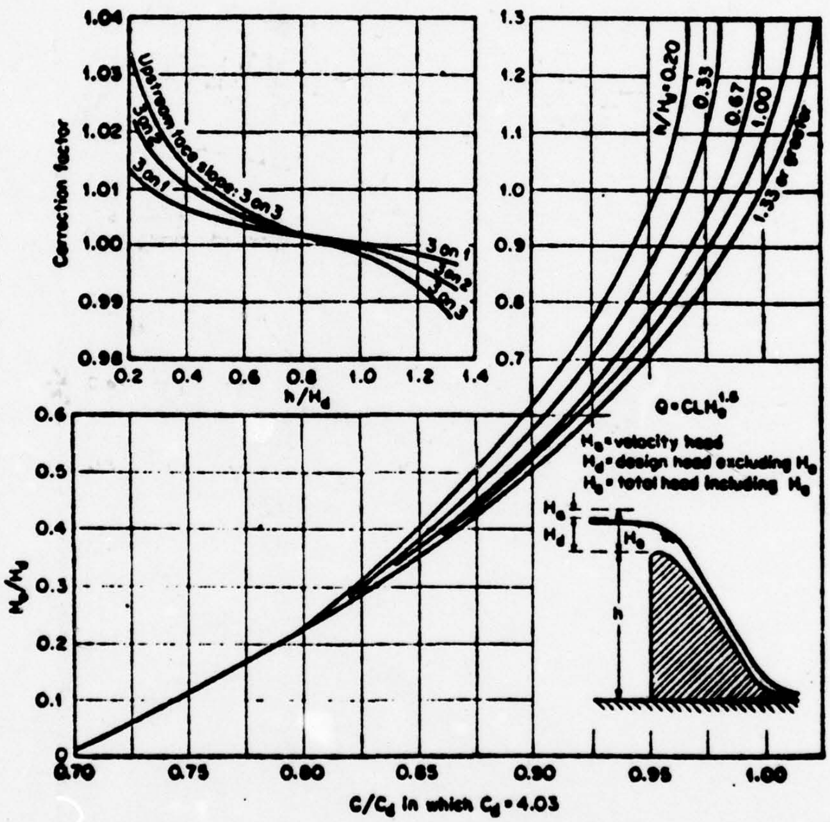
FIG. 15-17. Decrease in discharge coefficient for submerged overflow spillways. (U.S. Army Engineers Waterways Experiment Station)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 DESIGN BRIEF

PROJECT NAME NEW YORK STATE INSPECTION DATE 6·19·79

SUBJECT HIGH DAM - LOCK Nº 7 PROJECT NO. 230

STAGE - DISCHARGE RELATIONSHIP DRAWN BY JFG



C-13b

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.19.79

SUBJECT CURVE DAM - LOCK #7 PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP DRAWN BY

FRANCIS SUBMERGED WEIR FORMULA

FIG. 22.—Submerged sharp-crested weir.

where Q = discharge, cfs.
l = effective length of weir, ft.
h = measured head on crest, ft, upstream from weir beyond beginning of surface curve.
h' = difference in elevation of water surfaces (= $h - d$).
d = depth of submergence.

$$Q = 3.33\, l \sqrt{h'}\, (h + 0.381\, d)$$

$$Q = 3.33\, l \sqrt{h'}\, (h' + 1.381\, d)$$

SOLVE FOR h' WITH DOWNSTREAM Q'S

ELEV(USGS)	d	Qd	l	h'	h	WATER SURFACE ELEV
267.5	0	0	517	0	0	
270.0	2.5	54,750	↓	7.85	10.35	277.85
275.0	7.5	88,525	↓	7.90	15.40	282.90
280.0	12.5	128,500	↓	8.40	20.90	288.40
285.0	17.5	174,250	517	8.90	26.40	293.90

NEGLECT SUBMERGENCE

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PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6·19·79

SUBJECT: CURVE DAM - LOCK #7 — PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP — DRAWN BY: JPG & NFD

DOWNSTREAM CHANNEL FLOW

MANNING'S FORMULA: $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

ASSUME: $n = 0.035$

$S = 0.00122$ ft/ft

CHANNEL IS RECTANGULAR - 400' WIDTH

	ELEV (USGS)	h	1.49/n	A	R	S	Q
	255	0	42.57	0	0	0.00122	0
	260	5	↓	2000	5	↓	8,750
	265	10		4000	10		27,820
TOP OF DAM	267.5	12.5		5000	12.5		40,380
	270	15		6000	15		54,750
	275	20		8000	20		88,525
	280	25		10000	25		128,500
	285	30		12000	30		174,250
	290	35	42.57	14000	35	0.00122	224,400

FREE WEIR FLOW

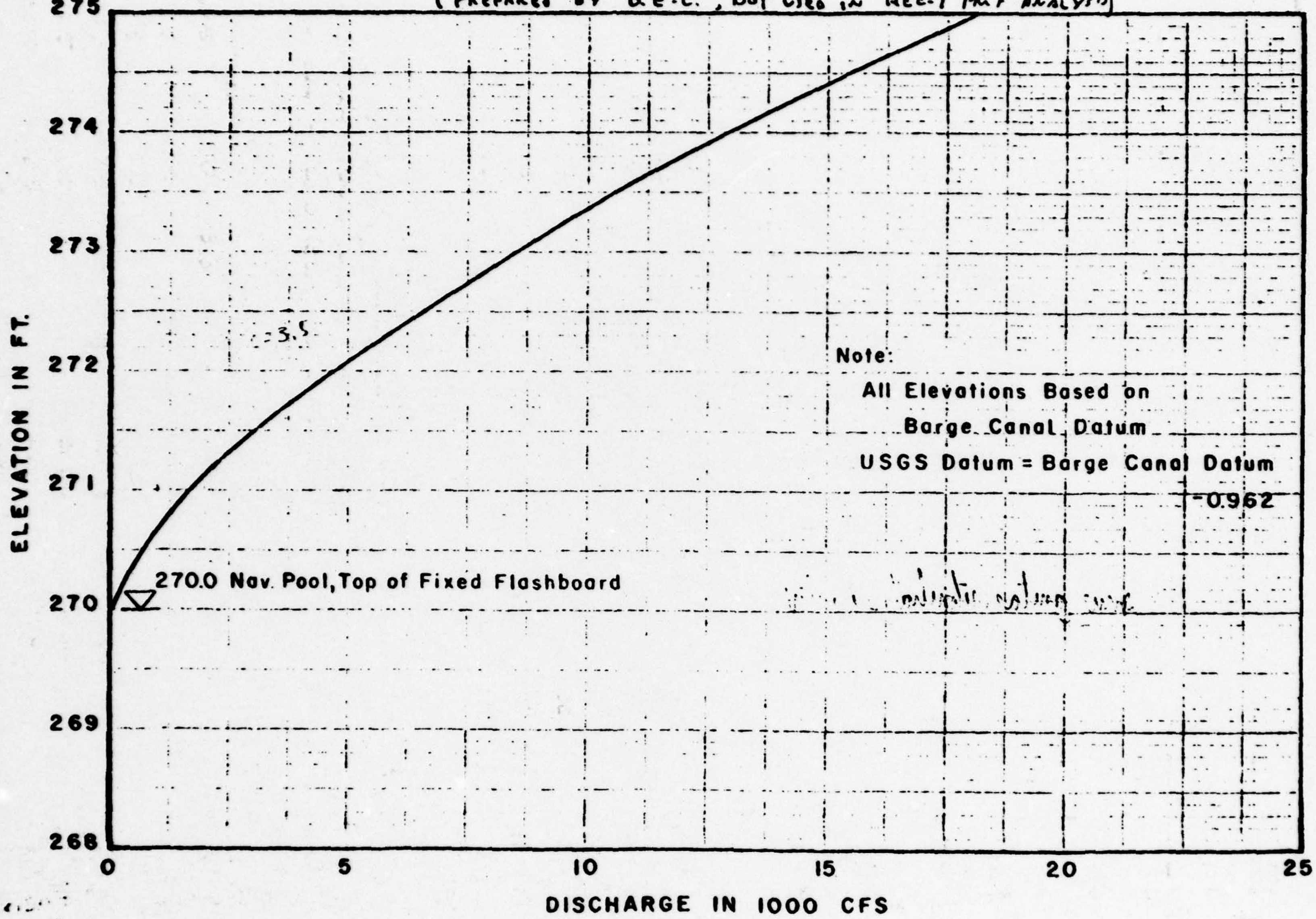
BC - BARGE CANAL DATUM
USGS - USGS DATUM

BASE OF DAM - 256.0 (BC) ; 255.0 (USGS)
TOP OF DAM - 268.5 (BC) ; 267.5 (USGS)

ELEV (USGS)	h	C	L	$H^{1.5}$	Q
267.5	0	3.3	517	0	0
270.0	2.5	↓	↓	3.95	6,750
272.5	5.0			11.18	19,100
275.0	7.5			20.54	35,040
277.5	10.0			31.60	53,900
280.0	12.5			44.20	75,400
282.5	15.0			58.10	99,100
285.0	17.5			73.21	124,900
290.0	22.5	3.3	517	106.73	182,100

RATING CURVE AT LOCK O-7, OSWEGO

(PREPARED BY D.E.C., NOT USED IN HEC-1 PMF ANALYSIS)



198

HYDRAULICS

Figure C-17 Rating Curve At Lock 0-7
Figure C-18 Stage Discharge Computations
Figure C-19 Stage Discharge Curve
Figure C-20 Stage Storage Computations

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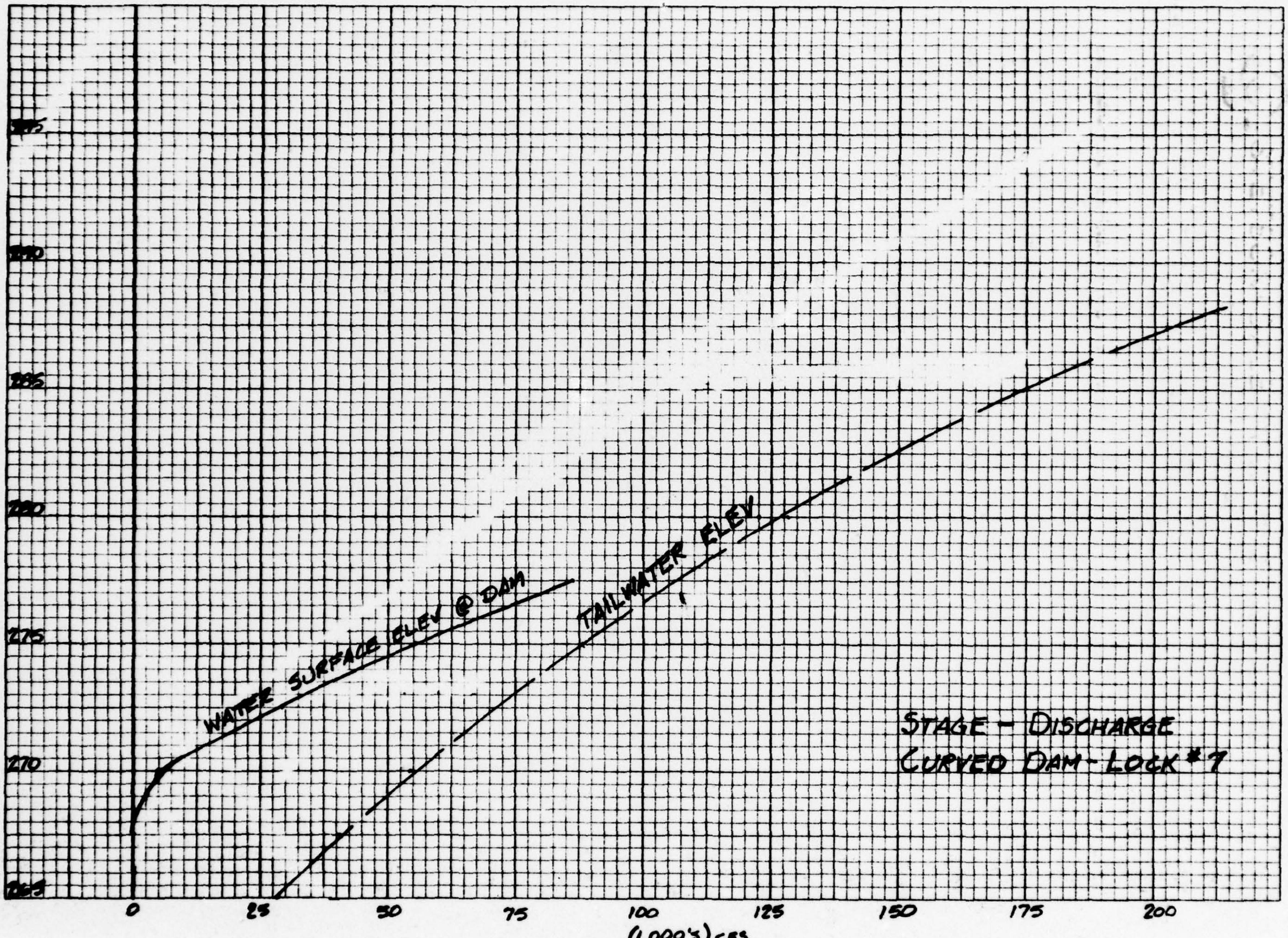
10 X 10 PER INCH
DIETZGEN CORPORATION
MADE IN U.S.A.



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PROJECT NAME New York State Dam Inspection DATE 6·18·79

SUBJECT Curved Dam - Lock #7 PROJECT NO. 2305

Stage - Storage Relationship DRAWN BY JPG

Elev	End Area (Acres)	Vol (Acre-ft)	Storage (Acre-ft)
251			
252	.0289	2.9	2.9
254	.0291	11.6	14.5
256	.0294	23.5	38.0
258	.0299	35.9	73.9
260	.0303	48.5	122.4
262	.0308	60.0	182.4
264	.0310	62.0	244.4
266	.0314	62.8	307.2
268	.0318	63.6	370.8
270	.0321	64.2	435.0
272	.0325	65.0	600.0
274	.0329	65.8	665.8
276	.0332	66.4	732.2
278	.0336	67.2	799.4
280	.0340	68.0	867.4
282	.0343	68.6	936.0
284	.0347	69.4	1005.4
286	.0351	70.2	1075.6
288	.0354	70.8	1146.4
290	.0358	71.6	1218.0

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APPENDIX D

STABILITY ANALYSIS

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PROJECT NAME: CURVED DAM - LOCK #7 DATE

SUBJECT: STABILITY ANALYSIS - OVERTURNING & SLIDING PROJECT NO.

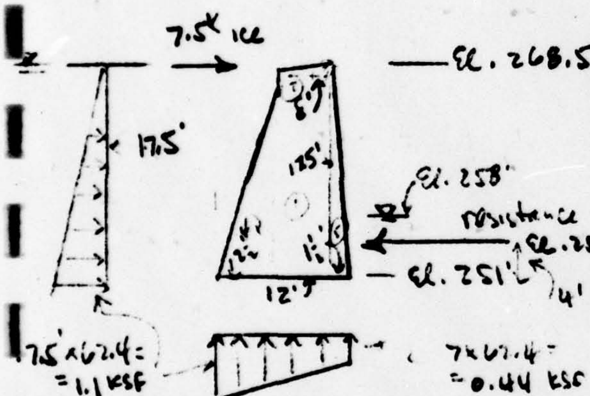
DRAWN BY

see attached sketch for dam cross-section

OVERTURNING

I. WL @ normal operating level

assume WL @ top of dam (elev. 268.5) with ice force acting; if flashboards are utilized, WL is raised and water pressure on dam is increased but ice load cannot be assumed because flashboards would fail under the ice force.



neglect wt. of H_2O on upstream face (safe)

$\mu = 0.65$

bond = 50 psi

resistance due to apron $= \mu(20' \times 7.5 \times .15) + (.05 \times 144 \times 20')$
$= 5 + 144 = 149^K/ft$

data review indicates the stone apron is bolted to rock and pinned together - assume bolting resistance is greater than shear-bond value

(i) moments about toe resisting overturning $= M_{dam} + M_{apron}$

$$= \left[(8 \times 14 \times .15)(5.5) + (7.5 \times 8 \times .15)(5.5) + (8.1 \times \tfrac{1}{2} \times .15)(\tfrac{8}{3} + 1.5) + (\tfrac{2.5}{2} \times 14 \times .15)(10.3) + (17.5 \times \tfrac{1.5}{2} \times .15)(1.0)\right] + (149^K \times 4') = 140.5 + 596 \quad 737^{1K}$$

(ii) moments about toe causing out $= M_{H_2O\,press} + M_{uplift} + M_{ice}$

$$= (1.1 \times \tfrac{17.5}{2} \times \tfrac{17.5}{3}) + (7.5 \times 17') + \left[(0.44 \times 12 \times \tfrac{12}{2}) + (1.1 - 0.44)(\tfrac{12}{2})(\tfrac{2 \times 12}{3})\right] =$$

$$= 56 + 128 + 32 + 32 = 248^{1K}$$

64 56

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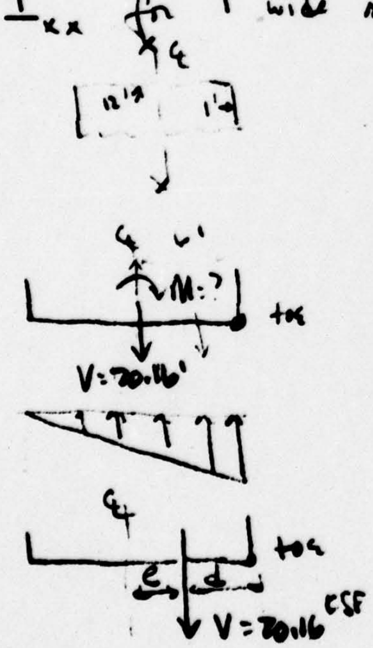
FS against overturning $= \frac{737^{1k}}{248^{1k}} = 3.0$

note this FS based on utilizing maximum resistance of downstream apron - the apron resistance is passive, developing as needed up to its maximum value.

Position of resultant using the maximum resisting moment is outside the dam section. Working backwards, determine the lower limit of apron resistance necessary in order for resultant to be located at $\frac{1}{3}$ base:

ΣV = wt. dam - uplift : $25^k - \left(\frac{1.1 + 0.44}{2}\right)(12') = 15.8^k$

I_{xx} for 1' wide section of dam $= \frac{1}{12} bh^3 = \frac{1}{12}(1)(12 \times 12 \times 12) = 144\ ft^4$



$\frac{V}{A} = \frac{15.8^k}{12 \times 1\ ft^2} = 1.32\ ksf$

for triangular stress distribution, $M_{req} = 31.7^{1k}$

i.e. $\left[\sigma = \frac{Mc}{I} \text{ or } M_c = \frac{\sigma I}{c} = \frac{1.32 \times 144}{6} = 31.7^{1k} \right]$

location of V : $e = \frac{M}{V} = \frac{31.7}{15.8} \doteq 2'$

therefore $d = 4'$

M_{toe} due to V and d $= 15.8^k \times 4' \doteq 63^{1k}$

(cont'd)

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cont'd

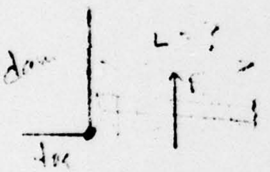
for resisting moment of forces acting on dam to be 81^{1k} greater than overturning moment the total resisting moment is $63^{k} + 248^{1k} = 311^{1k}$

[F.S. = 311 / 248 = 1.25±]

Since resisting moment due to wt. of dam = 140^{1k}, the resisting moment to be provided by apron becomes $311 - 140 = 171^{1k}$.

The required resistance can be developed in shear bond if the apron remains a monolith.

Create possibility that apron section adjacent to dam buckles and fractures. What width section (L) is required to keep dam stable —



based upon bond/tensile resistance of 50 psi between apron and fill

M due to F = 171^{1k} = .05 × 144 × L × L/2

L = 4½'

reasonable to assume this can develop

bond/shear on a 4½' apron section = (.05 × 144 × 4.5) = 32.4^{k}

moment about dam toe due to 32.4^{k} lateral force

= 32.4^{k} × 4 = 130^{1k} close.

per old

conc. apron steel 65 psi to obtain 17 moment

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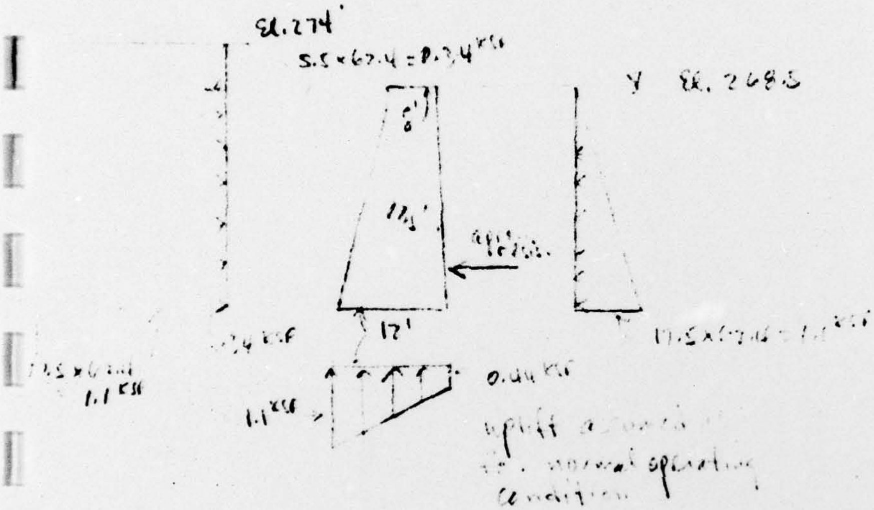
II. WL @ ½ PMF elevation

elev. upstream 274', 5½' above dam
elev. downstream 268.5'



neglect vertical force of H_2O on upstream face (safe)

(i) resisting moment due to wt dam = 141 ᶦᵏ

(ii) resisting moment due to downstream water pressure = 1.1 × $\frac{11}{2}$ × $\frac{11}{3}$ = 53 ᶦᵏ

(iii) moment causing o/t due to uplift = 64 ᶦᵏ

(iv) moment causing o/t due to upstream horiz. water pressure
= (0.34 × 11.5 × $\frac{11.5}{2}$) + (1.1 × $\frac{11}{2}$ × $\frac{11}{3}$) = 105 ᶦᵏ

(v) moment resisting o/t due to presence of downstream apron = up to 596

max. available FS against overturning = $\frac{(141 + 53 + 596)}{(105 + 64)} = \frac{790}{169} = 4.7$

as for case I apron resistance is passive, developing (increasing) as required until max. value is obtained

Cont'd

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PROJECT NAME ______ DATE ______

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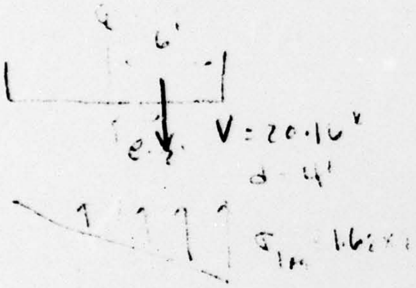
Cont'd — determine apron resistance required for stability against overturning and resultant passing thru 1/3 point of base

ΣV = wt. dam − uplift = 25 − 9.3 = 15.7 k

$\frac{V}{A} = \frac{15.7}{12 \times 1} = 1.31$ ksf



for triangular stress distribution, $M^{c}_{req} = 31.7$ 1k

since $\sigma = \frac{Mc}{I}$

or $M = \frac{\sigma I}{c} = \frac{1.31 \times 144}{6} = 31.7$ 1k

$\sigma_{heel} = \frac{V}{A} - \frac{Mc}{I}$ $\quad \sigma_{toe} = 1.31 + 1.31 = 2.6$ ksf

$= 1.31 - 1.31 = 0$

M_{toe} due to V and d = 15.7 k × 4' = 63 1k

For resisting moment about toe to be 81" greater than causing, the total resisting moment required becomes

63 1k + 169 1k = 232 1k

Since resisting moment due to wt. dam and downst. H_2O pressure = 141 + 53 = 194 1k the resisting moment to be provided by apron becomes 232 k − 194 1k = 38 1k, reasonable to assume a 95 plf would be developed by a 2' width of apron

FS against overturning would be $\frac{232 \text{ 1k}}{169 \text{ 1k}} = 1.37$

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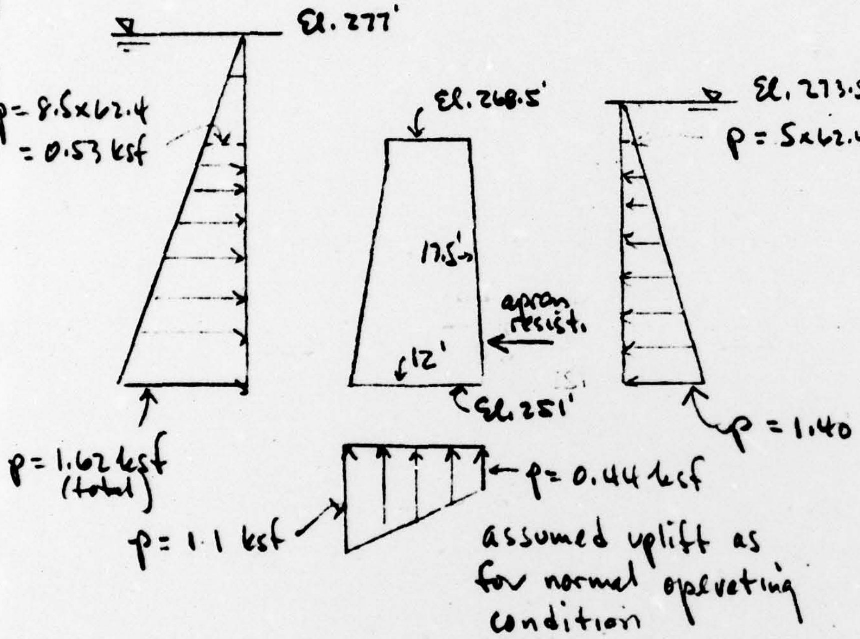
III. WL @ PMF elevations

elev. upstream 277', 8.5' above spillway
elev. downstream 273.5'



(i) resisting moment due to wt. dam = 141 ^{1k}

(ii) resisting moment due to downstream H_2O pressure =

$$= \left(0.31 \times 17.5 \times \frac{17.5}{2}\right) + (1.40 - 0.31)\left(\frac{17.5}{2} \times \frac{17.5}{3}\right) = 103^{1k}$$

47.5   55.6

(iii) moment causing out due to uplift = 64 ^{1k}

(iv) moment causing out due to upstream H_2O pressure =

$$\left(0.53 \times 17.5 \times \frac{17.5}{2}\right) + (1.62 - 0.53)\left(\frac{17.5}{2} \times \frac{17.5}{3}\right) = 137^{1k}$$

81   55.6

(a) FS against overturning, neglecting apron resistance

$$= \frac{141 + 103}{64 + 137} = \frac{244}{201} = 1.21$$

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Position of resultant would be

$$d = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{(244 - 201)^{1k}}{(29.4 - 9.3)^{k}} = 2' \text{ from toe}$$

(note $\frac{b}{3} = 4'$)

(b) FS against ovt applying max. passive resistance of apron (M_{apron} = 5

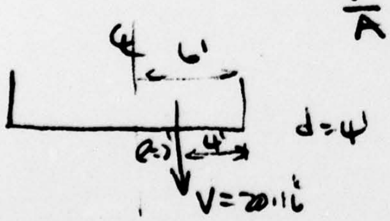
$$\underline{FS} = \frac{244 + 596}{201} = \underline{4.18}$$

(c) as for case I and II, apron resistance is passive, developing (increasing as required until reaching max value)

determine apron resistance required for stability against overturning and resultant passing thru 1/3 base

$$\Sigma V = \text{wt. dam} - \text{uplift} = 25 - 9.3 = 15.7^{k}$$

$$\frac{V}{A} = \frac{15.7}{12 \times 1} = 1.31 \text{ ksf}$$



M_{toe} due to V and $d = 15.7^{k} \times 4' = 63^{1k}$

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For resisting moment about toe to be 63 ᵏ greater than causing; the total resisting moment required becomes

$$63^{'k} + 201^{'k} = 264^{'k}$$

Since resisting moment due to wt. dam and downstream H_2O pressure =

$$= 141 + 103 = 244^{'k}$$

the moment to be provided by apron resistance becomes

$$264^{'k} - 244^{'k} = 20^{'k}$$

with a moment arm distance of 4', the apron resistance $\cong 5^k$, reasonable to assume this would be developed by a 1' width

$\underline{FS}$ against overturning would be $= \dfrac{244^{'k}}{201^{'k}} = \underline{1.20}$

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II. WL @ ½ PMF elevations

(i) wt. of dam = 25^k

(ii) uplift = 9.3^k

(iii) lateral water force upstream = $\left(\frac{0.34+1.44}{2}\right)(17.5') = 15.6^k$

(iv) lateral water force downstream = $\left(1.1 \times \frac{17.5}{2}\right) = 9.6^k$

(v) lateral resistance provided by apron as required for wt. stability $= 9.5^k$

FS against sliding (friction - shear)

$$FS = \frac{(0.65)(\overset{\text{wt dam}}{25} \overset{\text{uplift}}{-9.3}) + (\overset{\text{shear-bond}}{.050 \times 144 \times 12}) + \overset{H_2O \text{ downstream}}{9.6^k} + \overset{\text{apron}}{9.5}}{15.6^k}$$

$$= \frac{116^k}{15.6^k} = 7.4 \pm$$

III. WL @ PMF elevations

$$\text{FS against sliding} = \frac{(0.65)(25 - 9.3) + (.05 \times 144 \times 12) + 5 + \left(\frac{.31+1.14}{2} \times 17.5\right)}{\left(\frac{0.53+1.62}{2}\right)(17.5)}$$

$$= \frac{117}{18.8} = 6.2 \pm$$

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______ DRAWN BY ______

SLIDING

I. WL @ normal pool level

(i) wt. of dam = $[(8\times14\times.15)+(2.5\times8\times.15)+(8\times1\times\frac{1}{2}\times.15)+ +(2.14\times14\times.15)+(17.5\times1.5\times.15)] = 16.8+3+0.6+2.6+2 = 25^k$

(ii) = $(\frac{1.1+0.44}{2})(12) = 9.3$ uplift force

FS against sliding (friction-shear method using 50 psi bond between dam and rock fdtn, $\mu = 0.65$)

$$FS = \frac{\mu N + (50 \overset{psi}{} \times 144 \overset{in^2/ft^2}{} \times 12 ft) + \text{lat. force from apron + water}}{\text{horiz. water press + ice}}$$

$$= \frac{(0.65)(25^k - 9.3^k) + (.050\times144\times12) + .32^k}{(1.11^k \times \frac{17.5}{2}) + 7.5^k}$$

$$= \frac{129}{17.1} = 7.5 \pm \quad (7.5^k \text{ ice + uplift act}) \text{ - ok.}$$

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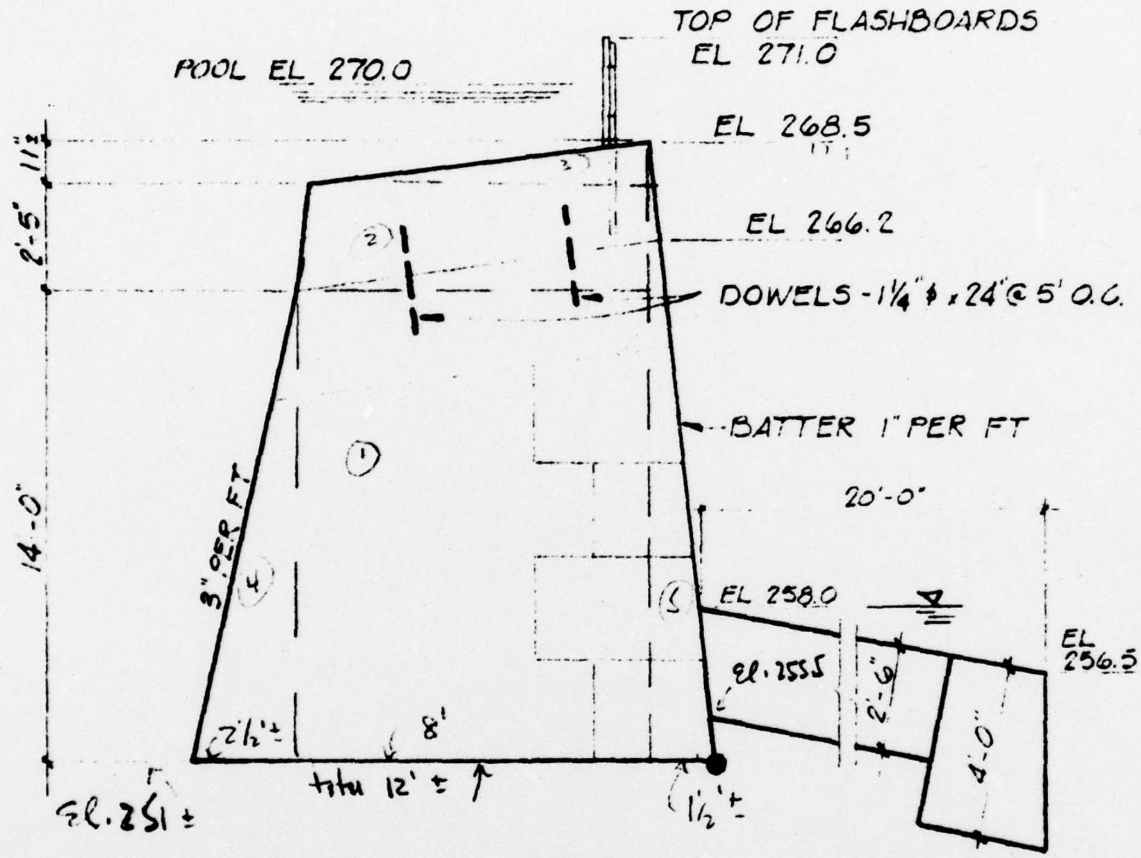
Operating elev. 270.0'
PMF elev. 277
8.5' above spillway
tailwater elev 273.75'
1/2 PM elev 273.5'



CURVED DAM
LOCK Nº 7
1/4" = 1'-0"

— Cross-section assumed for stability analysis —

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	JOB 2305	APP'D	

APPENDIX E

REFERENCES

APPENDIX

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	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) John B. Stetson, P.E.	8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale Engineering Company Bankers Trust Building Utica, New York 13501	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233	12. REPORT DATE 28 September 1979
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14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007	15. SECURITY CLASS. (of this report) UNCLASSIFIED
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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

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18. SUPPLEMENTARY NOTES

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Curved Dam-Lock 7
Oswego County
Oswego

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

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1. Within one year of notification, complete the following investigations:

   a. Perform a detailed investigation including subsurface investigations to determine the extent of and method of repair for through-the-dam and under-the-dam seepage.

2. After the aforementioned investigations, the remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

   a. Repair seepage and leaks through and beneath the dam.

   b. Repair the masonry in the east abutment wall. Align the masonry units and replace the missing masonry unit.

   c. Repair the boil located in a land area along the riverside wall of the navigation channel.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 62,500 cfs at 76% of the PMF, with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. Since the dam is capable of passing the 1/2 PMF without being overtopped, it is assessed as inadequate.